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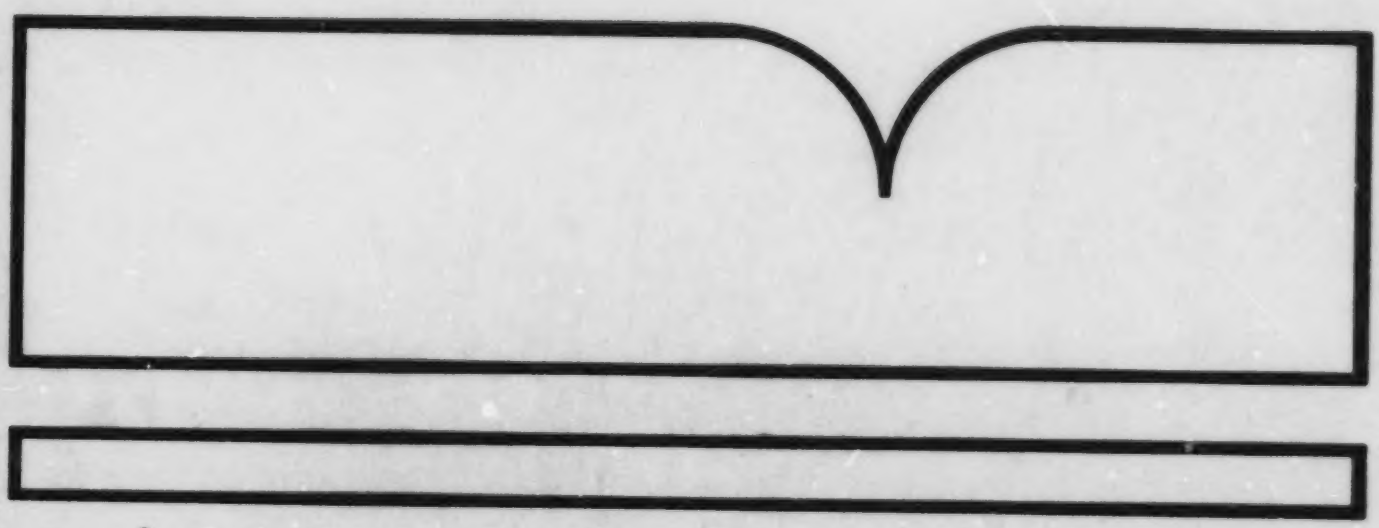
VOC (Volatile Organic Compounds) Fugitive Emission Data - High Density Polyethylene Process Unit

PEDCo Environmental, Inc.
Arlington, TX

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

Jun 81



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VOC FUGITIVE EMISSIONS DATA--
HIGH DENSITY POLYETHYLENE
PROCESS UNIT

Prepared for

Office of Air Quality Planning and Standards

Prepared by

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

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16. ABSTRACT The report gives data from a 10-month study of volatile organic compound (VOC) fugitive emissions from a high density polyethylene process unit. It gives statistics on leak frequency, leak occurrence, and leak recurrence, with a leak defined as having a screening value equal to or greater than 10,000 ppmv. The statistics are broken down into gas and light-liquid service. The report also includes a valve maintenance program; the data provide statistics on repair effectiveness.

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VOC FUGITIVE EMISSION DATA - HIGH DENSITY POLYETHYLENE PROCESS UNIT

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SECTION 1. INTRODUCTION

On July 31, 1979, the U.S. Environmental Protection Agency (EPA), Region VI, issued a Prevention of Significant Deterioration (PSD) permit to Allied Chemical Corporation to expand and modify its polyolefins plant in Baton Rouge, Louisiana. The plant proposed to build a new high-density polyethylene (HDPE) unit as an addition to its existing facility. The PSD permit conditions for the proposed unit specified a hydrocarbon fugitive emission leak rate of 6.3 lb/h and restricted the number of leaks to no more than five valves, flanges, pump seals, compressors, or other fugitive hydrocarbon sources. Under Section 307 of the Clean Air Act, Allied filed a lawsuit claiming that data from EPA studies on fugitive emissions of volatile organic compounds (VOC) from the petroleum refinery industry are not applicable to the chemical industry.

On October 16, 1979, Allied and EPA agreed to a 10-month study of fugitive VOC emissions from Allied's newest existing HDPE unit. The purpose of the study was to establish an achievable leak frequency, the leak rate of fugitive sources with instrument readings greater than or equal to 10,000 ppm by volume, and the success rate of infield repairs. Based on the results of this study, EPA agreed to amend the PSD permit provisions concerning fugitive mass emission rate and number of leaking fugitive VOC sources. The study lasted from October 31, 1979, to August 11, 1980, and consisted of six screening and source sampling tests. Because the study indicated that the achievable leak frequency was below 15 percent, EPA modified the PSD permit to reflect an allowable maximum of 15 leaks per 100 fugitive VOC sources. The hydrocarbon fugitive emission leak rate was not changed.

The Allied data provide fugitive emission information for a new HDPE unit. PEDCo has reviewed the data by standard statistical techniques. This report discusses differences between the screening, sampling, and maintenance procedures use by Allied and those used in previous EPA sponsored studies.

Results are presented for several parameters, including leak frequency, rate of leak occurrence, and rate of leak recurrence. Throughout the report, concentrations are expressed in parts per million by volume as indicated by the instrument meter reading. The instrument used by Allied was an OVA-108 calibrated with 1000 ppm hexane.

SECTION 2. BACKGROUND

Allied Chemical Corporation collected VOC fugitive emission data at its HDPE plant in Baton Rouge, Louisiana, from October 1979 to August 1980. The data were collected on the Reactor F, which uses the Phillips Petroleum HDPE process. This section describes the process, evaluates Allied's screening and source sampling procedures, and identifies the source data base.

PROCESS DESCRIPTION

Allied's Baton Rouge plant uses the Phillips Petroleum process to manufacture HDPE. Figure 1 is a flow diagram of this process. This is a relatively low-pressure liquid-phase process for the continuous production of polyethylene from high-purity ethylene. A solid catalyst is introduced into a reactor containing ethylene and isobutane. The catalyst has a high activity. Therefore, in large-scale use, the catalyst is added in such small quantities that no removal is necessary. Because almost all ethylene is converted to polyethylene, the process does not require any ethylene recycle or recovery systems. The product is removed from the reactor as a slurry and is flashed for removal of isobutane, which is recovered and recycled. The polymer in the form of a powder is fed to extrusion equipment for sale in the form of pellets.

ANALYTICAL APPROACH

This subsection compares Allied's fugitive emissions screening and sampling procedures with methods used in EPA sponsored studies.[1,2] It also compares Allied's maintenance procedures with the definition of directed maintenance.

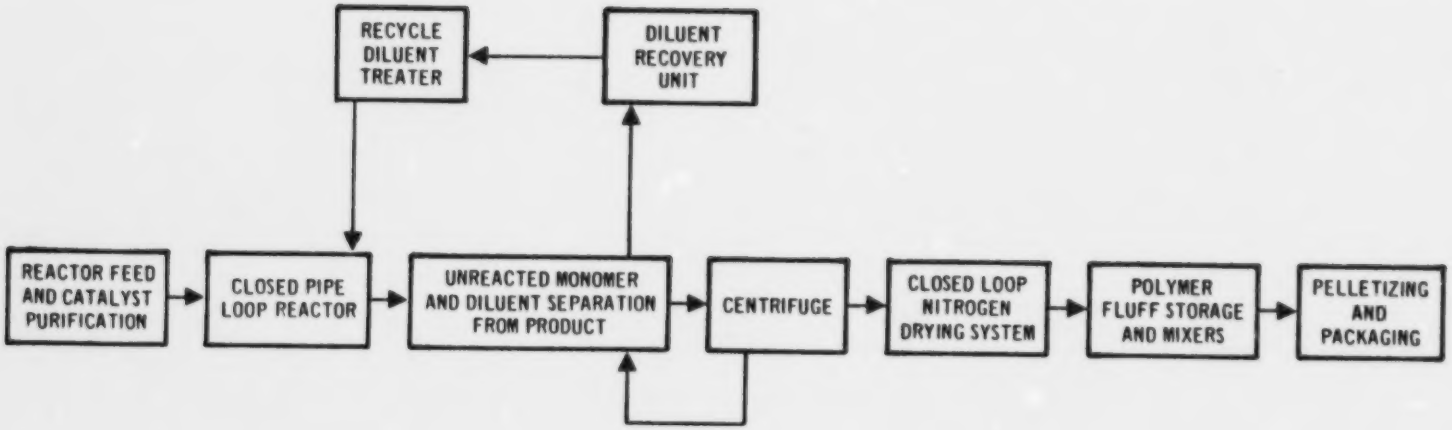

RECYCLE DILUENT TREATER
DILUENT RECOVERY UNIT
REACTOR FEED AND CATALYST PURIFICATION
CLOSED PIPE LOOP REACTOR
UNREACTED MONOMER AND DILUENT SEPARATION FROM PRODUCT
CENTRIFUGE
CLOSED LOOP NITROGEN DRYING SYSTEM
POLYMER FLUFF STORAGE AND MIXERS
PELLETIZING AND PACKAGING

Figure 1. Process flow diagram for Allied's Reactor F.

Screening Procedures

The proposed EPA method of screening sources for fugitive emissions uses an instrument detector which responds to the organic compounds being processed.[3] This includes, but is not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization. The instrument should be subjected to response time and calibration precision tests prior to being placed in service. Calibration gases required are a zero gas (air, <3 ppm VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. After the appropriate warm-up period and zero or internal calibration procedure, the calibration gas should be introduced into the instrument sample probe, and the instrument meter readout should be adjusted to correspond to the calibration gas value. Calibration should include the instrument and dilution apparatus if a dilution apparatus is used. The calibration precision test should be repeated every 6 months after the initial test. If any modification or replacement of the instrument detector is required, the instrument should be retested and a new 6-month quality assurance test schedule will apply. The response time test should be repeated if any modifications to the sample pumping system or flow configuration is made that would change the response time. Performance criteria are as follows:

Parameter	Specification
1. Response time	≤30 seconds
2. Calibration precision	≤10% of the calibration gas value

Specific screening procedures are recommended for different sources. Valves are to be screened at the stem and packing gland. Pumps, compressors, and agitators are to be screened at the shaft seal. The gap between two flange faces is to be circumscribed. Open-ended lines are to be screened in the center of the open end, and the perimeter is to be circumscribed. Sources are to be screened at the surface when possible.

Allied Chemical used a Century Systems Flame Ionization Analyzer (FIA), Model OVA-108, in its screening studies. The OVA was calibrated daily. Laboratory air was used for a zero concentration calibration gas. A midrange calibration gas of 1000 ppmv hexane in air was used. Calibrations were done

in the morning with both gases. An evening calibration with the zero air was done to detect any drift in the instrument response. Calibrations were made by introducing calibration gases directly into the instrument, noting the response, and adjusting the instrument as necessary. The zero air calibration was performed in the laboratory, whereas the midrange calibration was done in the field. No instrument drift was detected in any of the Allied Chemical screening studies.

Allied's use of the OVA differed from EPA's proposed procedure. Allied did not calibrate the instrument with a high standard and did not check the instrument calibration at the end of the day with the calibration gas standard.

Allied used a two-member team to conduct the screenings. One member did the screening while the other recorded all data. Data were gathered on the source and the organic concentration in the stream. The unit, area, and tag number were also recorded. Sources were screened at the source surface when possible. Any source with a screening value greater than or equal to 10,000 ppm was tagged as a leak. All leaks were reported to the maintenance department.

Sampling Procedures

The method used in previous EPA sponsored studies for sampling fugitive emissions from baggable sources is a dilution or flow through method.[4] This method enables a determination of composition and concentration of leaking product. The sample train should be assembled as shown in Figure 2. A tent of Mylar or Tedlar plastic should be constructed around the source. A small opening should be made on one side of the tent to allow ambient air into the system. Sample lines should be connected to the opposite side of the tent. A cold trap should be connected to the tent to condense water and heavy hydrocarbons. The sample is to be drawn through the cold trap and dry-gas meter and into sample bags by a vacuum pump. Hydrocarbon levels in the ambient air dilution stream should be determined by taking ambient air samples for each station. An FIA should be used to ensure equilibrium between dilution air and sample air before injection of the sample into the sample bag. The time, pressure, and temperature at the dry-gas meter should be recorded during sampling. Sample bag contents should be analyzed in a laboratory with a total

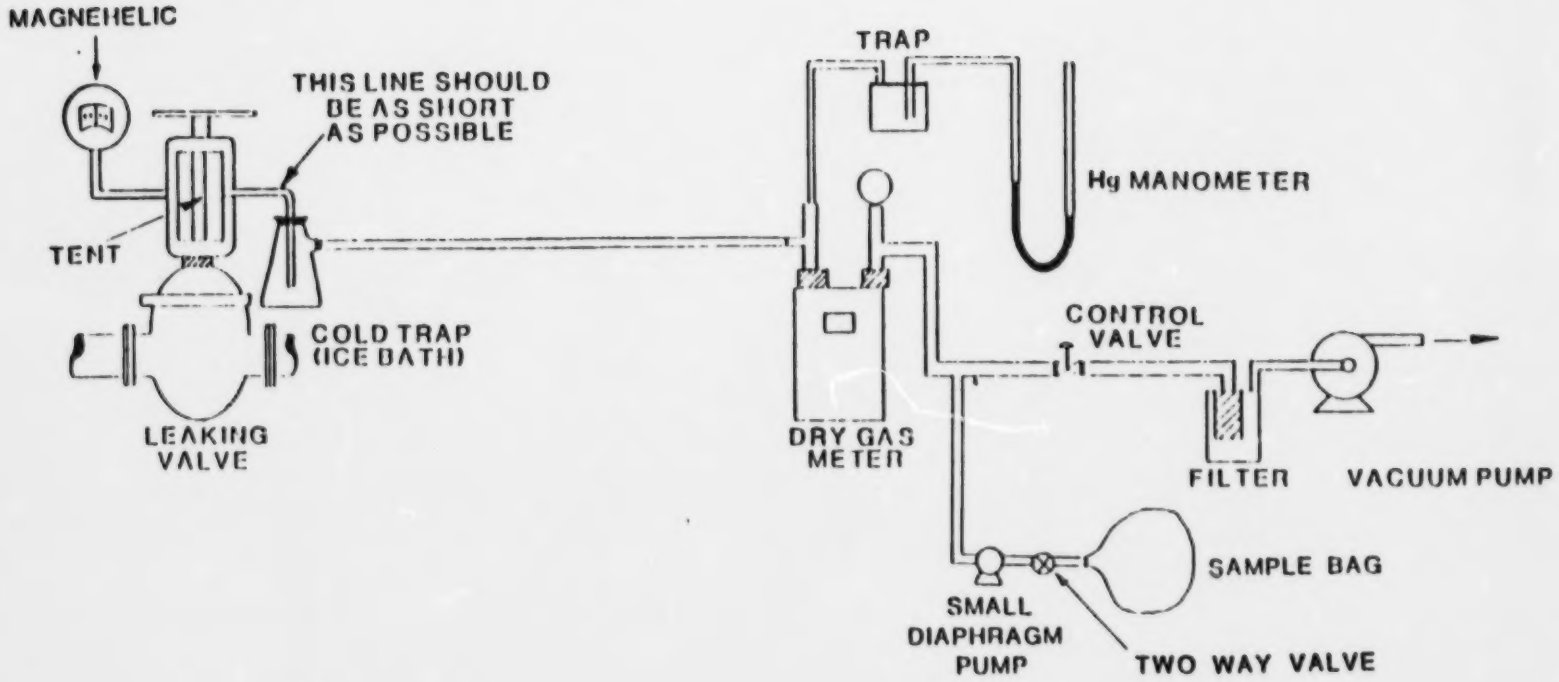


Figure 2. Sampling train for baggable sources of hydrocarbon emissions.[4]

hydrocarbon analyzer and a gas chromatograph (GC). The total hydrocarbon analyzer analyzes only methane and nonmethane hydrocarbon content. Gas chromatography is necessary for all quantitative analysis. Organic condensate collected in the cold trap together with the amount of VOC found in the sample bag determine the total amount of organics emitted. The leak rate can be calculated from total emissions and total sampling time. Each day, the FIA should be calibrated with gases in specific concentration ranges.

Sources of error in the sampling method include adsorption of VOC onto the walls of the sample bag and varying background concentrations. Several types of bags were tested. Mylar and Tedlar bags were found to be the least adsorbent.

Allied contracted with Kemron Environmental Services to conduct the source bagging and sample analyses. Kemron used a tenting method to bag samples. Suspected fugitive emission points were enclosed in a Mylar tent. Bottled air of predetermined hydrocarbon content was fed into one end of the Mylar tent at a known flow rate. This flow rate was measured upstream of the tent. Regulators and needle valve flow controllers were used to ensure a constant flow. A heat-traced sampling line was connected at the opposite end of the tent. This sample line was connected to a Tracor 550 GC through a Thomas diaphragm pump. An FIA was used to verify equilibrium between dilution air and sample air before injection of the sample into the gas chromatograph. Data from the GC were analyzed by a Hewlett-Packard 3385 integrator.

Kemron calibrated the FIA and GC daily during the bagging tests. The FIA was calibrated with certified concentrations of hexane in air. The wide range of concentrations expected necessitated calibrations with more than one standard. The GC was calibrated with gas standards for the individual compounds of interest. Response factors were compared with previous response factors to ensure that no changes in the equipment occurred. A strip chart recorder logged the FIA response and the data from the integrators. The source leak rate was calculated from the amount of total hydrocarbons collected in a specific time period.

Allied also sampled some sources and analyzed samples after the first screening. Airtight polyethylene sampling tents were put around leaking sources. Each tent was flushed with a purging medium, 2.45 percent methane in

nitrogen, for approximately 30 minutes into a large atmospheric sample container. The flow rate was maintained at 400 to 500 cm^3 per minute. A flow-meter downstream of the sample container indicated the flow rate. The sample container was transported to Allied's Quality Control Laboratory for analysis. Small gas samples were injected into a Hewlett Packard 5480A GC. Methane and other hydrocarbon peaks were quantified in digital form by the GC. Flow rates of other hydrocarbons were calculated from the known concentration of methane. Allied's procedure is given in Appendix A.

The differences between Kemron's sampling procedure and the sampling procedure used in previous EPA sponsored studies were as follows:

Kemron used bottled breathing air rather than ambient air as the dilution stream.

Kemron measured the air flow rate upstream of the Mylar tent rather than downstream of the tent.

Kemron ran heat-traced sample lines directly to the GC instead of a sample bag for transfer to the GC.

The differences between Allied's sampling procedure and methods used in previous studies were as follows:

Allied used polyethylene tents rather than Mylar or Tedlar tents.

Allied did not describe its calibration techniques and did not indicate whether the instruments were calibrated daily.

Directed Maintenance

Directed maintenance calls for the use of a detector while repair work is being done on a leaking source. The source should be maintained and screened until the meter reading is reduced below 10,000 ppm or until the limit of tightening is reached. Allied Chemical followed this procedure after the second screening test, but undirected maintenance was used after the other screening tests (i.e., the repairs were performed without a detector). Bolts and packing glands were tightened, but the repairman determined whether the repair was successful only by visual inspection. After maintenance, the repairman filed a report with the maintenance supervisor who then reported to Allied's environmental laboratory that rescreening was necessary. Rescreening was then conducted to ensure that meter readings were <10,000 ppm.

DATA COLLECTION

Allied chose Reactor F for the VOC fugitive emission study because it is the newest unit of the same design as the reactor proposed in the PSD permit. Allied reviewed the piping and instrumentation (P&I) diagram for Reactor F and identified a total of 1000 potential fugitive emission sources (see Appendix B). Each emission source was then tagged with an identifying checkpoint sequence number. The 1000 sources were distributed between liquid and gas services based on process conditions as follows:

Source	Liquid service	Gas service
Valves	215	78
Flanges	509	185
Other	3	10

Only two pump seals were identified in the source list. Because the pump seals could not provide enough data for statistical manipulation, these sources were included in the category designated "other."

Allied conducted six fugitive VOC source tests from October 1979 through August 1980. Appendix C lists the results of these tests, and Table 1 summarizes them. Allied instructed the screening team to identify each leaker (≧10,000 ppm) with a white tag to aid maintenance personnel. Allied provided the following information concerning fugitive emission tests:

> Maintenance was performed on some sources after Tests 1 and 2 before source sampling by Kemron.
>
> Readings above 10,000 ppm and up to 50,000 ppm were obtained with a Teledyne VOC detector only for Test 2. The Teledyne instrument was not calibrated against the OVA. This prevented comparison of the mass emission rates with the screening valves.
>
> Directed maintenance was performed only after Test 2. All other tests had undirected maintenance performed.
>
> Screening averaged approximately 6 man-days. The screening ranged from 10 days in the beginning to 4 days at the end of the project.
>
> The total cost of the six surveys was $165,000. This included the costs of screening, bagging, data analysis, computer time, and keypunching.

TABLE 1. SUMMARY OF VOC FUGITIVE EMISSION TEST RESULTS FOR REACTOR F OF ALLIED CHEMICAL.

Test No.	Test dates	Sources tested	Sources in all previous tests	Leakers (≧10,000 ppm)	Leak freq., %	Attempted repairs	Successful repairs	Repair effectiveness, %	Type of maintenance[a]
1	10/31 thru 12/05	902	902	148	16.4	83	46	43.4	U
2	1/07 thru 2/01	908	883	148	16.3	148	123	83.1	D
3	3/03 thru 3/24	923	881	89	9.6	89	45	49.4	U
4	4/12 thru 5/01	927	854	124	13.4	124	55	44.3	U
5	5/12 thru 6/15	940	845	66	7.0	66	40	60.6	U
6	7/07 thru 8/11	927	818	77	8.3	77	33	42.8	U

[a] D = Directed maintenance
U = Undirected maintenance

The 1000 sources represent all the fugitive emission sources at Reactor F. Inaccessible sources, however, were omitted from the surveys. Inaccessible sources are those which cannot be reached from the ground, a ladder, or a platform.

Allied selected the sources that Kemron bagged. Every third source was selected from an unnumbered list until approximately 36 sources were obtained.

Test 1

Test 1 lasted from October 31 to December 5, 1979. Beginning October 31, Allied screened 902 fugitive sources with the OVA; 148 sources had an OVA reading of 10,000 ppm. On November 2, Allied performed maintenance on 83 leaking sources. The 83 sources were rescreened on November 7. This maintenance was performed prior to the Kemron bagging. From November 27 to December 2, Kemron sampled 36 fugitive emission sources. On November 7 and 8, Allied sampled seven fugitive sources as a quality control check. Only one of these seven sources was also sampled by Kemron. The leak rate of the common source was measured at 0.0626 ton/yr by Allied and 0.1605 ton/yr by Kemron.

Test 2

Test 2 lasted from January 7 to February 1, 1980. Allied had begun the screenings on January 2, but had to shut down the reactor. A total of 149 fugitive sources were screened before reactor shutdown; 30 sources were leaking. Allied restarted the screenings on January 7. A total of 908 fugitive sources were screened with the OVA; a Teledyne VOC detector was used on sources with OVA readings of 10,000 ppm. The Teledyne instrument indicates concentrations up to 50,000 ppm. Allied, however, did not cross calibrate the Teledyne instrument with the OVA. Allied found 148 leaking sources. On January 10, 11, and 16, and February 1, Allied performed directed maintenance on the 148 leakers. On January 10 and February 6, 7, and 8, Kemron sampled 34 fugitive emission sources. These dates indicate that Allied performed some maintenance prior to the Kemron bagging.

Test 3

Test 3 lasted from March 3 to March 24, 1980. Beginning March 3, Allied screened 923 fugitive sources with the OVA; 89 sources were leaking. On March 10, 11, and 12, Kemron sampled 36 fugitive emission sources. On

March 23, Allied performed maintenance on the 89 leaking sources. On March 24, Allied rescreened the maintained sources.

Test 4

Test 4 lasted from April 12 to May 1, 1980. Beginning April 30, Allied screened 927 fugitive sources, 124 of which were leaking. On April 16 and 17, Kemron sampled 36 fugitive emission sources. On May 1, Allied performed maintenance on the leaking sources. On May 1, Allied rescreened the maintained sources, but not in conjunction with the maintenance work. These dates indicate that Kemron sampled sources before Allied screened and maintained them.

Test 5

Test 5 lasted from May 12 to June 15, 1980. Beginning May 12, Allied screened 940 fugitive sources, 66 of which were leaking. Computer printouts indicate that on May 13, Allied performed maintenance on the leaking sources. However, Allied indicated that this date is incorrect and the true date of maintenance is not known. On May 14 and 15, Kemron sampled 35 fugitive emission sources. On June 12, Allied rescreened the maintained sources.

Test 6

Test 6 lasted from July 7 to August 11, 1980. Beginning July 7, Allied screened 927 fugitive sources, 77 of which were leaking. On July 9, Kemron sampled 36 fugitive emission sources. On August 10, Allied performed maintenance on the leaking sources. On August 11, Allied rescreened the maintained sources.

SECTION 3. RESULTS

Allied's fugitive emission data were evaluated to determine leak frequency, rate of leak occurrence, and rate of leak recurrence. Repair effectiveness is also discussed, and the leak rates determined by the Kemron sample analyses are presented. As explained in Section 2, data were divided into six categories: two service types (liquid and gas) were identified for each of three source types (valves, flanges, and other). Because the categories of other sources in liquid service and gas service contained so few observations, they were not included in the analyses. Therefore, only valve and flange data were analyzed.

LEAK FREQUENCY

The leak frequency is defined as the percentage of screened sources with meter readings ≧10,000 ppm. Table 2 shows the leak frequency for each of the six tests by source and service. Table 3 presents the combined leak frequency for liquid and gas services by source.

RATE OF LEAK OCCURRENCE

The rate of leak occurrence (RLO) is defined as the percentage per unit time of sources screened at ≧10,000 ppm that had earlier been screened at <10,000 ppm. Note that only those sources screened in all 6 surveys were included in the analysis. Thus, this statistic is calculated from the number of nonleakers obtained during Test 1. For each successive test the cumulative number of new leakers (CNNL) is divided by the number of nonleakers obtained during Test 1 and converted to a percentage. This percentage is further divided by the average number of days after the end of Test 1 and multiplied by 30 days to express a monthly RLO. Table 4 presents the 30-day RLO for each test by source and service. Average rates of leak occurrence based on percent of original (i.e., at Test 1) nonleakers are calculated for each test period

TABLE 2. LEAK FREQUENCY BY SOURCE AND SERVICE.

Source	Statistic	Liquid service: Test 1 (0)[a]	Test 2 (58)	Test 3 (110)	Test 4 (148)	Test 5 (190)	Test 6 (250)
Flanges	No. of leakers	69	72	47	71	31	33
	No. of sources tested	471	474	482	463	469	464
	Leak frequency, %	14.6	15.2	9.8	15.3	6.6	7.1
	LCL,[b] %	11.7	12.2	7.4	12.3	4.7	5.1
	UCL,[c] %	18.1	18.7	12.7	18.9	9.2	9.8
Valves	No. of leakers	54	47	22	34	26	28
	No. of sources tested	197	206	208	206	209	200
	Leak frequency, %	27.4	22.8	10.6	16.5	12.4	14.0
	LCL,[b] %	21.7	17.6	7.1	12.1	8.6	9.9
	UCL,[c] %	34.0	29.2	15.5	22.2	17.6	19.5
		Gas service					
Flanges	No. of leakers	11	14	13	13	7	9
	No. of sources tested	149	146	148	169	173	175
	Leak frequency, %	7.4	9.6	8.8	7.7	4.0	5.1
	LCL,[b] %	4.2	5.8	5.2	4.6	2.0	2.7
	UCL,[c] %	12.7	15.5	14.4	12.7	8.1	9.5
Valves	No. of leakers	13	13	6	6	2	7
	No. of sources tested	74	71	74	77	76	76
	Leak frequency, %	17.6	18.3	8.1	7.8	2.6	9.2
	LCL,[b] %	10.6	11.0	3.8	3.6	0.7	4.5
	UCL,[c] %	27.8	28.8	16.6	16.0	9.1	17.8

[a]The day number in parenthesis indicates the number of days from the end of Test 1 to the end of the specified test.

[b]Lower 95 percent confidence limit.

[c]Upper 95 percent confidence limit.

TABLE 3. COMBINED LEAK FREQUENCY FOR LIQUID AND GAS SERVICES BY SOURCE.

Source	Statistic	Liquid and gas service					
		Test 1 (0)[a]	Test 2 (58)	Test 3 (110)	Test 4 (148)	Test 5 (190)	Test 6 (250)
Flanges	No. of leakers	80	86	60	84	38	42
	No. of sources	620	620	630	632	642	639
	Leak frequency, %	12.9	13.9	9.5	13.3	5.9	6.6
	LCL,[b] %	10.5	11.4	7.5	10.9	4.3	4.9
	UCL,[c] %	15.8	16.8	12.1	16.2	8.0	8.8
Valves	No. of leakers	67	60	28	40	28	35
	No. of sources tested	271	277	282	283	285	276
	Leak frequency, %	24.7	21.7	9.9	14.1	9.8	12.7
	LCL,[b] %	20.0	17.2	7.0	10.6	6.9	9.3
	UCL,[c] %	30.2	26.9	14.0	18.7	13.8	17.1

[a]The day number in parenthesis indicates the number of days from the end of Test 1 to the end of the specified test.

[b]Lower 95 percent confidence limit.

[c]Upper 95 percent confidence limit.

TABLE 4. THIRTY-DAY RATE OF LEAK OCCURRENCE BY SOURCE AND SERVICE.

Source	Statistic	Test 2 (58)[a]	Test 3 (110)	Test 4 (148)	Test 5 (190)	Test 6 (250)
		Liquid service				
Flanges[b] N = 362	No. of new leakers	43	19	21	5	8
	Cum. no. leakers	43	62	83	88	96
	%/30 days	6.1	4.7	4.6	3.8	3.2
	LCL,[c] %	4.6	3.7	3.8	3.2	2.7
	UCL,[d] %	8.1	5.8	5.6	4.6	3.8
Valves[b] N = 126	No. of new leakers	20	8	8	4	3
	Cum. no. leakers	20	28	36	40	43
	%/30 days	8.2	6.1	5.8	5.0	4.1
	LCL,[c] %	5.4	4.3	4.3	3.8	3.2
	UCL,[d] %	12.0	8.2	7.5	6.4	5.1
		Gas service				
Flanges[b] N = 127	No. of new leakers	8	5	2	0	1
	Cum. no. leakers	8	13	15	15	16
	%/30 days	3.3	2.8	2.4	1.9	1.5
	LCL,[c] %	1.7	1.7	1.5	1.2	0.9
	UCL,[d] %	6.2	4.6	3.8	2.9	2.3
Valves[b] N = 55	No. of new leakers	6	3	0	0	3
	Cum. no. leakers	6	9	9	9	12
	%/30 days	5.6	4.5	3.3	2.6	2.6
	LCL,[c] %	2.6	2.4	1.8	1.4	1.6
	UCL,[d] %	11.3	7.7	5.7	4.5	4.1

[a]The day number in parenthesis indicates the number of days from the end of Test 1 to the end of the specified test.

[b]N = number of nonleaking sources in the specified category at the initial screening after elimination of all sources which were not screened in all six tests.

[c]Lower 95 percent confidence limit.

[d]Upper 95 percent confidence limit.

and are normalized to a 30-day period. These values represent the average rates of leak occurrence over the total period from time zero (i.e., at Test 1) to the end of the test for which they were computed. This does not mean that the leak rate was assumed constant over that time period. These values can be used to approximate the rates of leak occurrence over any time period by applying the appropriate average 30-day rate. For example, the percent of leaks occurring over the first 180 days for valves in liquid service can be approximated by multiplying the 30-day rate for the fifth survey (5.0%) by six (i.e, 180/30) which gives 30 percent. Based on the original number of nonleakers of 126, one would expect approximately 38 (0.30 x 126 = 37.8) leak occurrences after 180 days. Table 5 presents the combined 30-day RLO for liquid and gas services by source.

RATE OF LEAK RECURRENCE

The rate of leak recurrence (RLR) is defined as the percentage per unit time of repaired sources (i.e., those with leaks reduced by maintenance below 10,000 ppm) that were subsequently screened at ≧10,000 ppm. Allied performed directed maintenance only after Test 2. Therefore, these statistics are computed on the number of repaired sources obtained during Test 2 that were rescreened in each successive test. For each successive test, the cumulative number of recurring leakers (CNRL) is divided by the number of repaired sources and converted to a percent. The percentage is further divided by the number of days to recurrence and multiplied by 30 days to express a monthly RLR. Table 6 presents the 30-day RLR by source and service at various intervals throughout the study. Table 7 presents the combined 30-day RLR for liquid and gas services by source. Table 8 provides the data used to determine the 30-day RLR.

REPAIR EFFECTIVENESS

The repair effectiveness is defined as the percentage of attempted repairs that were successful. Allied performed directed maintenance only after Test 2. Table 9 indicates the repair effectiveness of directed maintenance after Test 2 by source and service. Table 10 shows repair effectiveness after other tests by source and service, and Table 11 shows the combined repair

TABLE 5. COMBINED THIRTY-DAY RATE OF LEAK OCCURRENCE FOR LIQUID AND GAS SERVICES BY SOURCE.

Source	Statistic	Liquid and gas service				
		Test 2 (58)[a]	Test 3 (110)	Test 4 (148)	Test 5 (190)	Test 6 (250)
Flanges N = 489[b]	No. of new leakers	51	24	23	5	9
	Cum. no. leakers	51	75	98	103	112
	%/30 days	5.4	4.2	4.1	3.3	2.7
	LCL,[c] %	4.1	3.4	3.4	2.8	2.3
	UCL,[d] %	7.0	5.1	4.8	3.9	3.2
Valves N = 181[b]	No. of new leakers	26	11	8	4	6
	Cum. no. leakers	26	37	45	49	55
	%/30days	7.4	5.6	5.0	4.3	3.6
	LCL,[c] %	5.2	4.1	3.9	3.3	2.9
	UCL,[d] %	10.5	7.3	6.4	5.4	4.5

[a]The day number in parenthesis indicates the number of days from the end of Test 1 to the end of the specified test.

[b]N = number of nonleaking sources in the specified category at the initial screening after elimination of all sources which were not screened in all six tests.

[c]Lower 95 percent confidence limit.

[d]Upper 95 percent confidence limit.

TABLE 6. THIRTY-DAY RATE OF LEAK RECURRENCE BY SOURCE AND SERVICE.[a]

Source	Statistic	Liquid service: Number of Days[b] 52(3)	90(4)	132(5)	192(6)
Flanges N = 54[c]	No. of leakers	14	16	3	2
	CNRL[d]	14	30	33	35
	%/30 days	15.0	18.5	13.9	10.1
	LCL,[e] %	9.3	14.1	10.9	8.0
	UCL,[f] %	22.5	22.7	16.6	11.9
Valves N = 31[c]	No. of leakers	5	7	1	5
	CNRL[d]	5	12	13	18
	%/30 days	9.3	12.9	9.5	9.1
	LCL,[e] %	4.1	7.9	6.0	6.4
	UCL,[f] %	18.8	18.7	13.5	11.5
		Gas service			
Flanges N = 10[c]	No. of leakers	2	2	0	0
	CNRL[d]	2	4	4	4
	%/30 day	11.5	13.3	9.1	6.2
	LCL,[e] %	3.3	5.6	3.8	2.6
	UCL,[f] %	29.4	22.9	15.6	10.7
Valves N = 11[c]	No. of leakers	1	1	1	0
	CNRL[d]	1	2	3	3
	%/30 days	5.2	6.1	6.2	4.3
	LCL,[e] %	0.9	1.7	2.2	1.5
	UCL,[f] %	21.8	15.9	12.9	8.8

[a]Results are based on the leakers for Test 2 which were successfully repaired by directed maintenance (106 sources). These data are listed in Table 8.

[b]Number of days is determined from the end of Test 2 to the end of the specified test in parentheses.

[c]N = number of nonleakers after directed maintenance.

[d]Cumulative number of recurring leakers.

[e]Lower 95 percent confidence limit.

[f]Upper 95 percent confidence limit.

TABLE 7. COMBINED THIRTY-DAY RATE OF LEAK RECURRENCE FOR LIQUID AND GAS SERVICES BY SOURCE.[a]

Source	Statistic	Liquid and gas service, Number of Days[b] 52(3)	90(4)	135(5)	192(6)
Flanges N = 64[c]	No. of leakers	16	18	3	2
	CNRL[d]	16	34	37	39
	%/30 days	14.4	17.7	13.1	9.5
	LCL,[e] %	9.2	13.7	10.4	7.6
	UCL,[f] %	21.2	21.6	15.7	11.2
Valves N = 42[c]	No. of leakers	6	8	2	5
	CNRL[d]	6	14	16	21
	%/30 days	8.2	11.1	8.7	7.8
	LCL,[e] %	3.9	7.0	5.7	5.6
	UCL,[f] %	16.1	16.1	12.1	10.1

[a]Results are based on the leakers for Test 2 which were successfully repaired by directed maintenance (106 sources). These data are listed in Table 8.

[b]Number of days is determined from the end of Test 2 to the end of the specified test in parentheses.

[c]N = number of nonleakers after directed maintenance.

[d]Cumulative number of recurring leakers.

[e]Lower 95 percent confidence limit.

[f]Upper 95 percent confidence limit.

TABLE 8. DATA USED TO DETERMINE RATE OF LEAK RECURRENCE.[a]

	Test 3	Test 4	Test 5	Test 6
Flanges in liquid service	N	L	N	N
	L	L	N	N
	N	L	N	N
	L	L	N	N
	L	N	N	L
	L	L	L	L
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	L	N	N
	N	L	L	L
	N	L	L	L
	N	N	N	L
	N	N	N	N
	N	L	L	N
	N	L	N	N
	N	L	L	N
	N	N	L	L
	N	N	N	N
	N	L	N	N
	N	N	N	N
	N	N	N	N
	N	L	N	L
	N	N	N	N
	L	L	N	L
	L	L	N	N
	N	N	N	N
	L	L	N	N
	N	L	N	N
	N	N	L	N
	L	L	L	L
	N	N	N	N
	L	N	N	N
	N	N	L	N
	L	L	N	N
	N	L	N	N
	L	L	N	N
	N	L	N	N
	L	L	L	N
	N	N	N	N
	N	L	N	N
	L	L	N	N
	N	L	N	N
	N	N	N	N

(continued)

TABLE 8 (continued)

	Test 3	Test 4	Test 5	Test 6
	N	N	N	N
	L	L	L	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	L
	N	N	N	N
	N	N	N	N
	N	L	N	N
Flanges in gas service	L	N	N	N
	N	N	N	N
	N	N	N	N
	L	L	N	L
	N	N	N	N
	N	N	N	N
	N	L	N	N
	N	L	N	N
	N	N	N	N
	N	N	N	N
Valves in liquid service	L	L	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	L
	N	N	N	L
	N	N	N	N
	N	N	N	N
	N	N	L	L
	L	N	N	L
	L	L	L	L
	N	N	N	N
	N	N	N	N
	N	N	N	L
	N	N	N	L
	N	N	N	N
	N	L	L	N
	N	L	N	N
	L	L	N	L
	L	L	N	N
	N	N	N	L
	N	L	N	N
	N	L	L	N
	N	L	N	N

(continued)

TABLE 8 (continued)

	Test 3	Test 4	Test 5	Test 6
	N	N	N	N
	N	L	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	L	N	N
Valves in gas service	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	N	N
	N	N	L	L
	L	L	L	L
	N	L	N	N
	N	N	N	N

[a]This data tally is based on the 106 leakers found in Test 2 that were successfully repaired. The letter "N" indicates that a source was subsequently a nonleaker. The letter "L" indicates that a source was subsequently a leaker. Only sources for which screening data are available for all of the screening tests are included.

TABLE 9. REPAIR EFFECTIVENESS OF DIRECTED MAINTENANCE AFTER TEST 2 BY SOURCE AND SERVICE.

Source	Statistic	Liquid service	Gas service	Gas and liquid service
Flanges	No. of attempted repairs	72	14	86
	No. of successful repairs	59	12	71
	Repair eff, %	81.9	85.7	82.6
	LCL,[a] %	71.1	57.2	72.5
	UCL,[b] %	90.0	98.2	89.7
Valves	No. of attempted repairs	47	13	60
	No. of successful repairs	37	13	50
	Repair eff, %	78.7	100.0	83.3
	LCL,[a] %	64.2	75.3	70.0
	UCL,[b] %	87.9	100	90.6

[a]Lower 95 percent confidence limit.

[b]Upper 95 percent confidence limit.

Confidence limits were read directly from Reference 5.

TABLE 10. REPAIR EFFECTIVENESS OF UNDIRECTED MAINTENANCE BY SOURCE AND SERVICE.[a]

Source	Statistic	Liquid service Test 1	Test 3	Test 4	Test 5	Test 6
Flanges	No. of attempted repairs	38	45	71	31	34
	No. of successful repairs	18	20	32	19	14
	Repair eff, %	47.4	44.4	45.1	61.3	41.2
Valves	No. of attempted repairs	21	24	34	26	27
	No. of successful repairs	8	13	15	15	13
	Repair eff, %	38.1	54.2	44.1	57.7	48.1
		Gas service				
Flanges	No. of attempted repairs	11	13	13	7	10
	No. of successful repairs	3	6	6	5	4
	Repair eff, %	27.3	46.2	46.2	71.4	40.0
Valves	No. of attempted repairs	12	6	6	2	6
	No. of successful repairs	6	5	2	1	2
	Repair eff, %	50.0	83.3	33.3	50.0	33.3

[a]Repair effectiveness results are based on the number of successful repairs that Allied personnel found during the rescreening after each test. A leak could have recurred after the maintenance and before the rescreening, because the rescreening was conducted up to one month after the maintenance in some tests.

TABLE 11. REPAIR EFFECTIVENESS OF UNDIRECTED MAINTENANCE BY SOURCE.

Source	Statistic	Liquid and gas service				
		Test 1	Test 3	Test 4	Test 5	Test 6
Flanges	No. of attempted repairs	49	58	84	38	44
	No. of successful repairs	21	26	38	24	18
	Repair eff, %	42.9	44.8	45.2	70.6	40.9
Valves	No. of attempted repairs	33	30	40	28	33
	No. of successful repairs	14	18	17	16	15
	Repair eff, %	42.4	60.0	42.5	57.1	45.5

[a]Repair effectiveness results are based on the number of successful repairs that Allied personnel found during the rescreening after each test. A leak could have recurred after the maintenance and before the rescreening, because the rescreening was conducted up to one month after the maintenance in some tests.

effectiveness for liquid and gas services after other tests by source. The percentages in Table 10 and 11 are based on the number of successful repairs that Allied personnel found during the rescreening after each test. Appendix D contains a list of the successful and unsuccessful repairs.

LEAK RATE

The leak rate is defined as the mass of VOC fugitive emissions per unit time per leaker. Kemron conducted approximately 36 bagging tests during each survey. Allied selected the sources to be sampled by choosing every third one from an unnumbered list until the appropriate number was reached. Kemron's results are tabulated in Appendix E. Table 12 presents an arithmetic average of the bagging results by source and service for those sources which were bagged before maintenance. This average is an estimate of the emission rate for leaking sources, and it should not be compared to an emission factor which applies to all sources.

TABLE 12. LEAK RATES FOR LEAKERS BY SOURCE AND SERVICE.[a]

Source	Liquid service		Gas service	
	lb/h/source	kg/h/source	lb/h/source	kg/h/source
Flanges, mean	0.040	0.018	0.013	0.0059
LCL,[b] %	0.025	0.011	0.008	0.0036
UCL,[b] %	0.063	0.029	0.022	0.0100
No. tested[c]	70		20	
Valves, mean	0.047	0.021	0.0049	0.0022
LCL,[b] %	0.030	0.014	0.0027	0.0012
UCL,[b] %	0.076	0.034	0.0086	0.0039
No. tested[c]	56		7	

[a]Results were determined by Kemron bagging tests on a sample of 153 leakers (≥10,000 ppmv). The bagging test data used in the analysis are in Appendix E. The bagging test data not used (due to maintenance preceding the bagging test) are also in this appendix.

[b]The lower (LCL) and upper (UCL) 95 percent confidence limits are determined by using a pooled estimate of the variance for the four data sets.

[c]The number of bagging tests by source and service.

REFERENCES

1. Blacksmith, J. R., G. E. Harris, and G. J. Langley. Frequency of Leak Occurrence for Fittings in Synthetic Organic Chemical Plant Process Units. EPA-600/2-81-003, (NTIS No. PB81-141566). U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, September 1980.

2. Langley, G. J., and R. G. Wetherold. Evaluation of Maintenance for Fugitive VOC Emissions Control. EPA-600/2-81-080. U.S. Environmental Protection Agency, Cincinnati, Ohio. February 1981.

3. Proposed EPA Reference Method 21. Determination of Volatile Organic Compound Leaks, Federal Register, 45, No. 2, January 1981.

4. Rosebrook, D. D., compiler. Proceedings: Symposium on Atmospheric Emissions from Petroleum Refineries (November 1979, Austin, TX). EPA-600/9-80-013, March 1980.

5. Hald, A. Statistical Tables and Formulas. John Wiley and Sons, Inc., New York, 1952.

APPENDIX A

SAMPLING PROCEDURE USED BY ALLIED CHEMICAL CORPORATION

The following is a description of the tent sampling procedure used by the Allied Chemical Quality Control Laboratory.

ATTACHMENT NO. 2

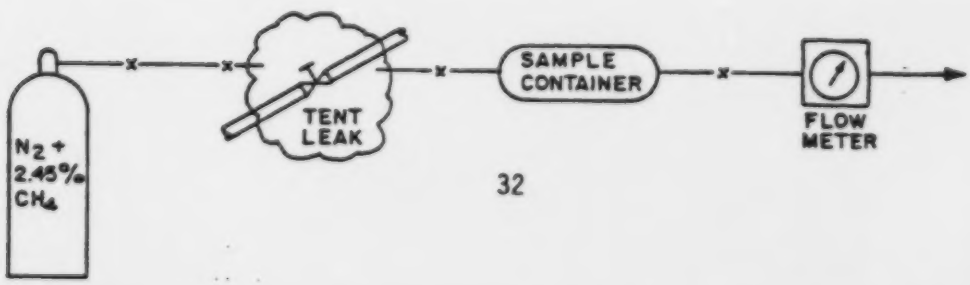
D. W. WHITTY
SUPERVISOR, ENVIRONMENTAL SERVICES

IN ORDER TO BETTER COORDINATE OUR OWN TENT SAMPLING PROCEDURES WITH THOSE PROPOSED BY KEMRON, SEVERAL VALVES AND FLANGES TESTED BY THEM WILL BE SPOT CHECKED BY THE ALLIED CHEMICAL QUALITY CONTROL LABORATORY. THE FOLLOWING PROCEDURE HAS BEEN USED WITH PREVIOUS SUCCESS AND WILL BE SUBSEQUENTLY FOLLOWED:

A POLYETHYLENE SAMPLING TENT WILL BE CONSTRUCTED AROUND THE LEAKING AREA AND A PURGE GAS FLOW PASSED THROUGH THE SAMPLING TRAIN SYSTEM. THE TRAIN WILL CONSIST OF THE TENT, FLOW CONTROLLER AND A STREAM OF ZERO GRADE NITROGEN CONTAINING A KNOWN METHANE CONTENT PREVIOUSLY ANALYZED BY GAS CHROMATOGRAPH. THIS GAS WILL PROVIDE AN INTERNAL STANDARD FOR DOUBLE CHECKING FLOW READINGS. DOWNSTREAM OF THE TENT, THE GAS IS ROUTED THROUGH A LARGE ATMOSPHERIC SAMPLE CONTAINER FOR TRANSPORT TO THE QUALITY CONTROL LAB CHROMATOGRAPH. THIS SAMPLE CONTAINER WILL PROVIDE SUFFICIENT SAMPLE FOR 8-10 REPLICATE DETERMINATIONS. FROM THE CONCENTRATIONS DETERMINED, THE LEAKAGE RATE WILL BE CALCULATED. FOLLOWING ARE MORE DETAILED PROCEDURES:

SAMPLING

1. AFTER APPROPRIATELY SELECTING THE LEAK, CONSTRUCT AN AIR TIGHT TENT AROUND THE VALVE, ETC.
2. FLUSH THE TENTED LEAKING POINT WITH PURGING MEDIUM (2.45% METHANE IN N_2) FOR 30 MINUTES, MAINTAINING A STEADY FLOW RATE OF 400-500 CC/MIN. AS SHOWN BELOW:



SAMPLING (CONT'D)

3. RECORD FLOW RATE AND REMOVE SAMPLE CONTAINER FOR SUBSEQUENT ANALYSIS.

ANALYSIS

1. USING A 10 µℓ GAS SYRINGE, DRAW AN APPROPRIATE SIZE SAMPLE CONTAINER FOR ANALYSIS.
2. INJECT INTO THE HEWLETT PACKARD 5480A GAS CHROMATOGRAPH, CONTAINING DUAL FID DETECTORS AND DIMETHYLSULFOLANE COLUMNS.
3. OBTAIN THE DIGITAL PEAK AREAS OF THE METHANE AND OTHER HYDROCARBONS IN THE SAMPLE.

CALCULATIONS

1. FROM THE KNOWN CONCENTRATION OF METHANE, CALCULATE CC/MIN. OF OTHER HYDROCARBONS AS FOLLOWS:

$$A \times .0245 = B$$

$$\frac{B \times C}{D} = \text{CC/MIN. HYDROCARBONS}$$

WHERE:

A = FLOW RATE OF PURGE GAS OBSERVED ON FLOWMETER (400-500 CC/MIN.)

B = FLOW RATE OF METHANE (METHANE CONCENTRATION = 2.45%)

C = PEAK AREA OF HYDROCARBONS

D = PEAK AREA OF METHANE

2. FROM THE ABOVE CALCULATED CC/MIN. OF HYDROCARBONS, DETERMINE THE KILOGRAMS/DAY OF SPECIFIC COMPOUND AS FOLLOWS:

$$\text{KG/DAY} = \text{CC/MIN.} \times \text{CONSTANT(K)}$$

WHERE:

K (ETHYLENE) = .0017

K (ISOBUTANE) = .0035

K (HEXENE-1) = .0012

ABOVE CONSTANTS BASED ON GAS DENSITIES OF EACH COMPOUND AT 60°F AND 1 ATM PRESSURE AS LISTED IN "NATURAL GAS PROCESSORS SUPPLIER ASSOCIATIONS'S ENGINEERING DATA BOOK". (ETHYLENE = .0012 GM/CC; ISOBUTANE = .0024 GM/CC; HEXENE-1 = .0008 GM/CC)

FOR GAS SAMPLES CONTAINING TWO OR MORE OF THE ABOVE DIFFERENT HYDROCARBONS, MULTIPLY BY THE APPROPRIATE PERCENTAGE FRACTION.

R. O. BLOXHAM

ROB:JF
10/18/79

APPENDIX B

FUGITIVE EMISSION SOURCES AT REACTOR F OF ALLIED CHEMICAL CORPORATION

The following appendix consists of source and service identification descriptions and the master list of possible emission sources. Note that an entry of zeros in the master list is an unexplained error. Also note the following units: psi is a gage reading, line size is in inches, and the flow rate is in lb/h.

PEDCo code	Leak type code	Allied code	Description
Flange	101	Valve	Suction flange
Valve	102	Valve	Packing gland
Valve	103	Valve	Suction surge bottle
Valve	104	Valve	Discharging surge bottle
Flange	105	Valve	Discharge flange
Flange	106	Valve	Flange
Flange	107	Valve	Inlet flange
Flange	108	Valve	Outlet flange
Other	109	Valve	Level glass
Flange	201	Screen	Suction flange
Flange	303	Flange	Suction surge bottle
Flange	304	Flange	Discharge surge bottle
Flange	309	Flange	Level glass
Flange	310	Flange	Nozzle
Flange	311	Flange	Orifice plate
Flange	313	Flange	Y strainer
Flange	315	Flange	Pipe
Flange	401	Vessel	Suction flange
Flange	405	Vessel	Discharge flange
Flange	406	Vessel	Flange
Flange	407	Vessel	Inlet flange
Flange	408	Vessel	Outlet flange
Valve	410	Vessel	Nozzle
Other	413	Vessel	Clean out tee cap
Flange	414	Vessel	Clean out tee flange
Flange	506	Exchanger	Flange
Flange	507	Exchanger	Inlet flange
Flange	508	Exchanger	Outlet flange
Flange	601	Pump	Suction flange
Other	602	Pump	Packing gland
Flange	605	Pump	Discharge flange
Flange	606	Pump	Flange
Flange	607	Pump	Inlet flange
Flange	608	Pump	Clean out tee flange
Other	612	Pump	Mechanical seal
Flange	707	Filter	Inlet flange
Flange	708	Filter	Outlet flange
Flange	807	Compressor	Inlet flange
Flange	808	Compressor	Outlet flange
Other	809	Compressor	Level glass
Other	813	Compressor	Clean out tee cap
Flange	814	Compressor	Clean out tee flange
Flange	906	Dryer	Flange
Flange	907	Dryer	Inlet flange
Other	912	Dryer	Mechanical seal

SERVICE IDENTIFICATION

First two digits:

10	Ethylene
15	Ethylene 50%/Isobutane 50%
20	Isobutane
30	Hexene
40	Isopentane

VOLATILE COMPOUNDS REPORTING
MASTER LIST OF CHECK POINTS
PROJECT TO DATE

CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0001	0400603	3	Z9Z9	101	20	6.0	12,500
0002	0400603	3	Z9Z9	101	20	6.0	12,500
0003	0400603	3	Z9Z9	102	20	6.0	12,500
0004	0400603	3	Z9Z9	201	20	6.0	12,500
0005	0400603	3	Z9Z9	000	20	.0	12,500
0006	0400603	3	Z9Z9	201	20	6.0	12,500
0007	0400603	3	Z9Z9	103	20	1.0	12,500
0008	0400603	3	Z9Z9	303	20	.0	12,500
0009	0400603	3	Z9Z9	103	20	.8	12,500
0010	0400603	40	Z9Z9	103	20	.8	12,500
0011	0400603	40	Z9Z9	103	20	.8	12,500
0012	0400603	40	Z9Z9	103	20	.8	12,500
0013	0400603	40	Z9Z9	304	20	.0	12,500
0014	0400603	40	Z9Z9	105	20	3.0	12,500
0015	0400603	40	Z9Z9	105	20	3.0	12,500
0016	0400603	40	Z9Z9	102	20	3.0	12,500
0017	0400603	40	Z9Z9	105	20	1.5	12,500
0018	0400603	40	Z9Z9	102	20	6.0	12,500
0019	0400603	40	Z9Z9	105	20	6.0	12,500
0020	0400603	40	Z9Z9	105	20	6.0	12,500
0021	0400603	40	Z9Z9	106	20	2.0	12,500
0022	0400603	40	Z9Z9	102	20	2.0	12,500
0023	0400603	40	Z9Z9	106	20	2.0	12,500
0024	0400603	40	Z9Z9	101	20	6.0	12,500
0025	0400603	40	Z9Z9	101	20	6.0	12,500
0026	0400603	40	Z9Z9	102	20	6.0	12,500
0027	0400603	40	Z9Z9	000	20	1.0	12,500
0028	0400603	40	Z9Z9	303	20	6.0	12,500
0029	0400603	40	Z9Z9	103	20	.8	12,500
0030	0400603	40	Z9Z9	103	20	.8	12,500
0031	0400603	210	Z9Z9	104	20	.8	12,500
0032	0400603	210	Z9Z9	104	20	.8	12,500
0033	0400603	210	Z9Z9	304	20	4.0	12,500
0034	0400603	210	Z9Z9	102	20	1.5	12,500
0035	0400603	210	Z9Z9	105	20	1.5	12,500
0036	0400603	210	Z9Z9	105	20	1.5	12,500
0037	0400603	210	Z9Z9	105	20	4.0	12,500
0038	0400603	210	Z9Z9	102	20	4.0	12,500
0039	0400603	210	Z9Z9	105	20	4.0	12,500
0040	0400603	210	Z9Z9	105	20	2.0	12,500
0041	0400603	210	Z9Z9	102	20	2.0	12,500
0042	0400603	210	Z9Z9	105	20	2.0	12,500
0043	0400603	3	Z9Z9	101	20	.8	12,500
0044	0400603	3	Z9Z9	102	20	.8	12,500
0045	0400603	3	Z9Z9	101	20	.8	12,500
0046	0400603	3	Z9Z9	000	20	.8	12,500
0047	0400603	3	Z9Z9	000	20	.0	12,500
0048	0400603	3	Z9Z9	000	20	.0	12,500
0049	0400603	3	Z9Z9	000	20	1.0	12,500

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0050	0400603	3	Z929	303	20	12.0	12,500
0051	0400603	3	Z929	103	20	.8	12,500
0052	0400603	3	Z929	103	20	.8	12,500
0053	0400603	40	Z929	104	20	.8	12,500
0054	0400603	40	Z929	104	20	.8	12,500
0055	0400603	40	Z929	304	20	.0	12,500
0056	0400603	40	Z929	105	20	3.0	12,500
0057	0400603	40	Z929	102	20	3.0	12,500
0058	0400603	40	Z929	105	20	3.0	12,500
0059	0400603	40	Z929	105	20	1.5	12,500
0060	0400603	40	Z929	105	20	6.0	12,500
0061	0400603	40	Z929	102	20	6.0	12,500
0062	0400603	40	Z929	105	20	6.0	12,500
0063	0400603	40	Z929	105	20	2.0	12,500
0064	0400603	40	Z929	102	20	2.0	12,500
0065	0400603	40	Z929	105	20	2.0	12,500
0066	0400603	40	Z929	101	20	6.0	12,500
0067	0400603	40	Z929	102	20	6.0	12,500
0068	0400603	40	Z929	101	20	6.0	12,500
0069	0400603	40	Z929	000	20	1.0	12,500
0070	0400603	40	Z929	303	20	6.0	12,500
0071	0400603	40	Z929	103	20	.8	12,500
0072	0400603	40	Z929	103	20	.8	12,500
0073	0400603	210	Z929	104	20	.8	12,500
0074	0400603	210	Z929	104	20	.8	12,500
0075	0400603	210	Z929	304	20	4.0	12,500
0076	0400603	210	Z929	102	20	1.5	12,500
0077	0400603	210	Z929	105	20	1.5	12,500
0078	0400603	210	Z929	000	20	1.5	12,500
0079	0400603	210	Z929	105	20	4.0	12,500
0080	0400603	210	Z929	102	20	4.0	12,500
0081	0400603	210	Z929	105	20	4.0	12,500
0082	0400603	210	Z929	105	20	2.0	12,500
0083	0400603	210	Z929	102	20	2.0	12,500
0084	0400603	210	Z929	105	20	2.0	12,500
0085	0403504	3	Z929	106	20	12.0	25,000
0086	0403504	3	Z929	102	20	12.0	25,000
0087	0403504	3	Z929	106	20	12.0	25,000
0088	0403504	3	Z929	407	20	8.0	25,000
0089	0403504	3	Z929	106	20	1.5	25,000
0090	0403504	3	Z929	408	20	8.0	25,000
0091	0403504	3	Z929	106	20	3.0	25,000
0092	0403504	3	Z929	102	20	1.0	25,000
0093	0403504	3	Z929	106	20	12.0	25,000
0094	0403504	3	Z929	102	20	12.0	25,000
0095	0403504	3	Z929	106	20	12.0	25,000
0096	0403504	3	Z929	102	20	.5	25,000
0097	0403504	3	Z929	102	20	.5	25,000
0098	0403504	3	Z929	106	20	12.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0099	0403504	3	Z9Z9	102	20	12.0	25,000
0100	0403504	3	Z9Z9	106	20	12.0	25,000
0101	0403504	3	Z9Z9	407	20	8.0	25,000
0102	0403504	3	Z9Z9	106	20	1.5	25,000
0103	0403504	3	Z9Z9	408	20	8.0	25,000
0104	0403504	3	Z9Z9	106	20	3.0	25,000
0105	0403504	3	Z9Z9	106	20	1.0	25,000
0106	0403504	3	Z9Z9	106	20	12.0	25,000
0107	0403504	3	Z9Z9	102	20	12.0	25,000
0108	0403504	3	Z9Z9	106	20	12.0	25,000
0109	0403504	3	Z9Z9	406	20	.0	25,000
0110	0403504	3	Z9Z9	406	20	.0	25,000
0111	0403549	3	Z9Z9	309	20	2.0	25,000
0112	0403549	3	Z9Z9	109	20	.8	25,000
0113	0403549	3	Z9Z9	109	20	.5	25,000
0114	0403549	3	Z9Z9	109	20	.0	25,000
0115	0403549	3	Z9Z9	106	20	.5	25,000
0116	0403549	3	Z9Z9	410	20	2.0	25,000
0117	0403549	3	Z9Z9	106	20	1.0	25,000
0118	0403549	3	Z9Z9	106	20	2.0	25,000
0119	0403549	3	Z9Z9	102	20	2.0	25,000
0120	0403549	3	Z9Z9	106	20	2.0	25,000
0121	0000000	3	Z9Z9	106	20	4.0	25,000
0122	0000000	3	Z9Z9	102	20	4.0	25,000
0123	0000000	3	Z9Z9	106	20	4.0	25,000
0124	0000000	3	Z9Z9	106	20	.8	25,000
0125	0000000	3	Z9Z9	106	20	4.0	25,000
0126	0000000	3	Z9Z9	102	20	4.0	25,000
0127	0000000	3	Z9Z9	106	20	4.0	25,000
0128	0000000	3	Z9Z9	106	20	4.0	25,000
0129	0000000	3	Z9Z9	106	20	4.0	25,000
0130	0000000	3	Z9Z9	102	20	4.0	25,000
0131	0000000	3	Z9Z9	106	20	4.0	25,000
0132	0000000	3	Z9Z9	106	20	4.0	25,000
0133	0000000	3	Z9Z9	102	20	4.0	25,000
0134	0000000	3	Z9Z9	106	20	4.0	25,000
0135	0000000	40	Z9Z9	106	20	6.0	12,500
0136	0000000	40	Z9Z9	102	20	6.0	12,500
0137	0000000	40	Z9Z9	106	20	6.0	12,500
0138	0000000	40	Z9Z9	106	20	.8	12,500
0139	0000000	40	Z9Z9	106	20	6.0	12,500
0140	0000000	40	Z9Z9	102	20	6.0	12,500
0141	0000000	40	Z9Z9	106	20	6.0	12,500
0142	0000000	40	Z9Z9	106	20	.8	12,500
0143	0000000	40	Z9Z9	106	20	6.0	12,500
0144	0000000	40	Z9Z9	102	20	6.0	12,500
0145	0000000	40	Z9Z9	106	20	6.0	12,500
0146	0000000	40	Z9Z9	106	20	6.0	12,500
0147	0000000	40	Z9Z9	102	20	6.0	12,500

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0148	0000000	40	Z9Z9	106	20	6.0	12,500
0149	0000000	200	Z9Z9	106	20	3.0	12,500
0150	0000000	200	Z9Z9	102	20	3.0	12,500
0151	0000000	200	Z9Z9	106	20	3.0	12,500
0152	0000000	200	Z9Z9	106	20	.8	12,500
0153	0000000	200	Z9Z9	106	20	3.0	12,500
0154	0000000	200	Z9Z9	102	20	3.0	12,500
0155	0000000	200	Z9Z9	106	20	3.0	12,500
0156	0000000	200	Z9Z9	106	20	.8	12,500
0157	0000000	200	Z9Z9	106	20	3.0	12,500
0158	0000000	200	Z9Z9	102	20	3.0	12,500
0159	0000000	200	Z9Z9	106	20	3.0	12,500
0160	0000000	200	Z9Z9	106	20	3.0	12,500
0161	0000000	200	Z9Z9	102	20	3.0	12,500
0162	0000000	200	Z9Z9	106	20	3.0	12,500
0163	0000000	200	Z9Z9	106	20	.5	12,500
0164	0000000	200	Z9Z9	106	20	.5	12,500
0165	0000000	200	Z9Z9	311	20	3.0	12,500
0166	0000000	200	Z9Z9	106	20	.5	12,500
0167	0000000	200	Z9Z9	106	20	.5	12,500
0168	0400603	40	Z9Z9	105	20	6.0	25,000
0169	0400603	40	Z9Z9	102	20	6.0	25,000
0170	0400603	40	Z9Z9	105	20	6.0	25,000
0171	0403551	5	Z9Z9	106	20	.8	25,000
0172	0403551	5	Z9Z9	406	20	.0	25,000
0173	0000000	5	Z9Z9	106	20	10.0	25,000
0174	0000000	5	Z9Z9	106	20	.5	25,000
0175	0000000	5	Z9Z9	106	20	.5	25,000
0176	0403551	5	Z9Z9	406	20	1.5	25,000
0177	0403551	5	Z9Z9	408	20	10.0	25,000
0178	0407003	5	Z9Z9	906	20	10.0	25,000
0179	0400802	5	Z9Z9	906	20	18.0	25,000
0180	0400603	210	Z9Z9	105	20	.5	25,000
0181	0400603	210	Z9Z9	105	20	.5	25,000
0182	0400603	210	Z9Z9	105	20	.5	25,000
0183	0400603	210	Z9Z9	105	20	6.0	25,000
0184	0400603	210	Z9Z9	105	20	6.0	25,000
0185	0400603	210	Z9Z9	105	20	6.0	25,000
0186	0400603	210	Z9Z9	102	20	6.0	25,000
0187	0400603	210	Z9Z9	105	20	6.0	25,000
0188	0400603	210	Z9Z9	105	20	4.0	25,000
0189	0400603	210	Z9Z9	102	20	4.0	25,000
0190	0400603	210	Z9Z9	105	20	4.0	25,000
0191	0400603	210	Z9Z9	106	20	1.0	25,000
0192	0401003	40	Z9Z9	507	20	3.0	25,000
0193	0401003	40	Z9Z9	507	20	3.0	25,000
0194	0401003	40	Z9Z9	507	20	3.0	25,000
0195	0401003	40	Z9Z9	508	20	3.0	25,000
0196	0401003	40	Z9Z9	508	20	3.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0197	0401003	40	Z9Z9	508	20	1.0	25,000
0198	0401003	40	Z9Z9	507	20	3.0	25,000
0199	0401003	40	Z9Z9	507	20	3.0	25,000
0200	0401003	40	Z9Z9	507	20	3.0	25,000
0201	0401003	40	Z9Z9	508	20	3.0	25,000
0202	0401003	40	Z9Z9	508	20	3.0	25,000
0203	0401003	40	Z9Z9	508	20	3.0	25,000
0204	0401003	40	Z9Z9	107	20	6.0	25,000
0205	0401003	40	Z9Z9	102	20	6.0	25,000
0206	0401003	40	Z9Z9	107	20	6.0	25,000
0207	0401003	40	Z9Z9	108	20	6.0	25,000
0208	0401003	40	Z9Z9	102	20	6.0	25,000
0209	0401003	40	Z9Z9	108	20	6.0	25,000
0210	0401003	40	Z9Z9	106	20	.5	25,000
0211	0401003	40	Z9Z9	106	20	.5	25,000
0212	0401003	40	Z9Z9	106	20	.8	25,000
0213	0401003	40	Z9Z9	106	20	.5	25,000
0214	0401003	40	Z9Z9	105	20	1.5	25,000
0215	0401003	40	Z9Z9	102	20	1.0	25,000
0216	0401003	40	Z9Z9	107	20	6.0	25,000
0217	0401003	40	Z9Z9	102	20	6.0	25,000
0218	0401003	40	Z9Z9	107	20	6.0	25,000
0219	0401003	40	Z9Z9	108	20	6.0	25,000
0220	0401003	40	Z9Z9	102	20	6.0	25,000
0221	0401003	40	Z9Z9	108	20	6.0	25,000
0222	0401003	40	Z9Z9	102	20	1.5	25,000
0223	0401003	40	Z9Z9	102	20	1.0	25,000
0224	0000000	40	Z9Z9	106	20	4.0	25,000
0225	0000000	40	Z9Z9	102	20	4.0	25,000
0226	0000000	40	Z9Z9	106	20	4.0	25,000
0227	0000000	40	Z9Z9	106	20	.8	25,000
0228	0000000	40	Z9Z9	106	20	4.0	25,000
0229	0000000	40	Z9Z9	102	20	.0	25,000
0230	0000000	40	Z9Z9	106	20	4.0	25,000
0231	0000000	40	Z9Z9	106	20	.8	25,000
0232	0000000	40	Z9Z9	106	20	4.0	25,000
0233	0000000	40	Z9Z9	102	20	4.0	25,000
0234	0000000	40	Z9Z9	106	20	4.0	25,000
0235	0000000	40	Z9Z9	106	20	4.0	25,000
0236	0000000	40	Z9Z9	102	20	4.0	25,000
0237	0000000	40	Z9Z9	106	20	4.0	25,000
0238	0403513	40	Z9Z9	106	20	1.5	25,000
0239	0403513	40	Z9Z9	106	20	1.0	25,000
0240	0403513	40	Z9Z9	106	20	1.5	25,000
0241	0403513	40	Z9Z9	309	20	2.0	25,000
0242	0403513	40	Z9Z9	109	20	.5	25,000
0243	0403513	40	Z9Z9	109	20	.0	25,000
0244	0403513	40	Z9Z9	109	20	.5	25,000

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0245	0403513	40	Z929	106	20	.8	25.000
0246	0401006	210	Z929	102	20	4.0	25.000
0247	0401006	210	Z929	106	20	4.0	25.000
0248	0401006	210	Z929	507	20	4.0	25.000
0249	0401006	210	Z929	102	20	1.5	25.000
0250	0401006	210	Z929	102	20	1.0	25.000
0251	0401006	210	Z929	106	20	.5	25.000
0252	0401006	210	Z929	508	20	3.0	25.000
0253	0401006	210	Z929	106	20	.8	25.000
0254	0401006	210	Z929	108	20	3.0	25.000
0255	0401006	210	Z929	102	20	3.0	25.000
0256	0401006	210	Z929	108	20	3.0	25.000
0257	0401006	210	Z929	102	20	4.0	25.000
0258	0401006	210	Z929	107	20	4.0	25.000
0259	0401006	210	Z929	507	20	4.0	25.000
0260	0401006	210	Z929	106	20	.8	25.000
0261	0401006	210	Z929	106	20	1.5	25.000
0262	0401006	210	Z929	106	20	1.0	25.000
0263	0401006	210	Z929	508	20	3.0	25.000
0264	0401006	210	Z929	106	20	.8	25.000
0265	0401006	210	Z929	108	20	3.0	25.000
0266	0401006	210	Z929	102	20	3.0	25.000
0267	0401006	210	Z929	108	20	3.0	25.000
0268	0401006	210	Z929	106	20	.8	25.000
0269	0401006	210	Z929	106	20	.8	25.000
0270	0401006	210	Z929	106	20	2.0	25.000
0271	0401006	210	Z929	102	20	2.0	25.000
0272	0401006	210	Z929	106	20	2.0	25.000
0273	0402405	225	Z929	101	20	4.0	25.000
0274	0402405	225	Z929	102	20	4.0	25.000
0275	0402405	225	Z929	101	20	4.0	25.000
0276	0402405	225	Z929	102	20	.8	25.000
0277	0402405	225	Z929	102	20	.8	25.000
0278	0402405	225	Z929	102	20	.8	25.000
0279	0402405	225	Z929	601	20	4.0	25.000
0280	0402405	225	Z929	612	20	.0	25.000
0281	0402405	350	Z929	102	20	.5	25.000
0282	0402405	350	Z929	605	20	3.0	25.000
0283	0402401	350	Z929	605	20	.5	25.000
0284	0402405	350	Z929	105	20	.0	25.000
0285	0402405	350	Z929	105	20	3.0	25.000
0286	0402405	350	Z929	102	20	3.0	25.000
0287	0402405	350	Z929	105	20	3.0	25.000
0288	0402405	225	Z929	101	20	4.0	25.000
0289	0402405	225	Z929	102	20	4.0	25.000
0290	0402405	225	Z929	102	20	4.0	25.000
0291	0402405	225	Z929	102	20	.8	25.000
0292	0402405	225	Z929	102	20	.8	25.000
0293	0402405	225	Z929	102	20	.8	25.000

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0294	0402405	225	Z9Z9	601	20	4.0	25,000
0295	0402405	225	Z9Z9	612	20	.0	25,000
0296	0402405	350	Z9Z9	102	20	.5	25,000
0297	0402405	350	Z9Z9	605	20	3.0	25,000
0298	0402405	350	Z9Z9	106	20	.5	25,000
0299	0402405	350	Z9Z9	105	20	.0	25,000
0300	0402405	350	Z9Z9	105	20	3.0	25,000
0301	0402405	350	Z9Z9	102	20	3.0	25,000
0302	0402405	350	Z9Z9	105	20	3.0	25,000
0303	0400603	40	Z9Z9	106	20	3.0	25,000
0304	0400603	40	Z9Z9	102	20	3.0	25,000
0305	0400603	40	Z9Z9	106	20	3.0	25,000
0306	0400603	40	Z9Z9	106	20	1.5	25,000
0307	0000000	350	Z9Z9	106	20	3.0	25,000
0308	0000000	350	Z9Z9	102	20	3.0	25,000
0309	0000000	350	Z9Z9	106	20	3.0	25,000
0310	0000000	350	Z9Z9	102	20	.8	25,000
0311	0000000	350	Z9Z9	106	20	3.0	25,000
0312	0000000	350	Z9Z9	102	20	.0	25,000
0313	0000000	350	Z9Z9	106	20	3.0	25,000
0314	0000000	350	Z9Z9	102	20	.8	25,000
0315	0000000	350	Z9Z9	106	20	3.0	25,000
0316	0000000	350	Z9Z9	102	20	3.0	25,000
0317	0000000	350	Z9Z9	106	20	3.0	25,000
0318	0000000	350	Z9Z9	106	20	2.0	25,000
0319	0000000	350	Z9Z9	102	20	2.0	25,000
0320	0000000	350	Z9Z9	106	20	2.0	25,000
0321	0401005	225	Z9Z9	310	20	1.5	25,000
0322	0401005	225	Z9Z9	102	20	1.5	25,000
0323	0401005	225	Z9Z9	310	20	2.0	25,000
0324	0401005	225	Z9Z9	102	20	2.0	25,000
0325	0401005	225	Z9Z9	106	20	2.0	25,000
0326	0401005	225	Z9Z9	106	20	1.5	25,000
0327	0000000	225	Z9Z9	102	20	1.5	25,000
0328	0000000	225	Z9Z9	102	20	.8	25,000
0329	0000000	225	Z9Z9	102	20	.0	25,000
0330	0000000	225	Z9Z9	102	20	.8	25,000
0331	0000000	225	Z9Z9	106	20	1.0	25,000
0332	0000000	225	Z9Z9	102	20	1.5	25,000
0333	0000000	225	Z9Z9	102	20	1.5	25,000
0334	0000000	225	Z9Z9	102	20	1.0	25,000
0335	0000000	225	Z9Z9	106	20	.5	25,000
0336	0000000	225	Z9Z9	102	20	1.0	25,000
0337	0000000	225	Z9Z9	106	20	1.0	25,000
0338	0401005	225	Z9Z9	507	20	6.0	25,000
0339	0401005	225	Z9Z9	106	20	1.5	25,000
0340	0000000	600	Z9Z9	102	20	1.0	8,500
0341	0000000	600	Z9Z9	102	20	.8	8,500
0342	0000000	600	Z9Z9	311	20	1.0	8,500

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0343	0000000	600	Z9Z9	106	20	.5	8,500
0344	0000000	600	Z9Z9	106	20	.5	8,500
0345	0000000	210	Z9Z9	102	20	.0	8,500
0346	0000000	210	Z9Z9	106	20	.8	8,500
0347	0000000	210	Z9Z9	102	20	1.0	8,500
034A	0000000	210	Z9Z9	106	20	2.0	8,500
0349	0000000	210	Z9Z9	102	20	2.0	8,500
0350	0000000	210	Z9Z9	106	20	2.0	8,500
0351	0000000	750	Z9Z9	106	10	2.0	1,000
0352	0000000	750	Z9Z9	102	10	2.0	1,000
0353	0000000	750	Z9Z9	106	10	2.0	1,000
0354	0000000	750	Z9Z9	102	10	.5	1,000
0355	0000000	750	Z9Z9	102	10	.5	1,000
0356	0000000	210	Z9Z9	102	10	.5	1,000
0357	0000000	210	Z9Z9	106	10	2.0	1,000
0358	0000000	210	Z9Z9	102	10	2.0	1,000
0359	0000000	210	Z9Z9	106	10	2.0	1,000
0360	0000000	210	Z9Z9	102	10	1.5	1,000
0361	0000000	210	Z9Z9	106	10	1.5	1,000
0362	0000000	210	Z9Z9	106	10	1.5	1,000
0363	0000000	210	Z9Z9	507	20	4.0	25,000
0364	0000000	210	Z9Z9	102	20	.5	25,000
0365	0000000	210	Z9Z9	102	20	1.5	25,000
0366	0000000	210	Z9Z9	102	20	1.0	25,000
0367	0000000	210	Z9Z9	508	20	4.0	25,000
0368	0000000	210	Z9Z9	311	20	4.0	25,000
0369	0000000	210	Z9Z9	102	20	.5	25,000
0370	0000000	210	Z9Z9	102	20	.5	25,000
0371	0000000	210	Z9Z9	106	20	4.0	25,000
0372	0000000	210	Z9Z9	102	20	4.0	25,000
0373	0000000	210	Z9Z9	106	20	4.0	25,000
0374	0000000	210	Z9Z9	102	20	.8	25,000
0375	0000000	210	Z9Z9	106	20	1.5	25,000
0376	0000000	210	Z9Z9	102	20	.0	25,000
0377	0000000	70	Z9Z9	106	20	1.5	25,000
037A	0000000	70	Z9Z9	102	20	.8	25,000
0379	0000000	70	Z9Z9	106	20	4.0	25,000
0380	0000000	70	Z9Z9	102	20	4.0	25,000
0381	0000000	70	Z9Z9	106	20	4.0	25,000
0382	0000000	70	Z9Z9	106	20	3.0	25,000
0383	0000000	70	Z9Z9	102	20	3.0	25,000
0384	0000000	70	Z9Z9	106	20	3.0	25,000
0385	0401007	70	Z9Z9	506	20	1.5	25,000
0386	0401007	70	Z9Z9	102	20	1.5	25,000
0387	0401007	70	Z9Z9	106	20	.8	25,000
0388	0402407	70	Z9Z9	106	20	4.0	25,000
0389	0402407	70	Z9Z9	102	20	4.0	25,000
0390	0402407	70	Z9Z9	106	20	4.0	25,000
0391	0402407	70	Z9Z9	601	20	4.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0392	0402407	750	Z9Z9	102	20	.5	25.000
0393	0402407	750	Z9Z9	102	20	.8	25.000
0394	0402407	750	Z9Z9	106	20	.5	25.000
0395	0402407	750	Z9Z9	106	20	3.0	25.000
0396	0402407	750	Z9Z9	106	20	.8	25.000
0397	0402407	750	Z9Z9	106	20	3.0	25.000
0398	0402407	750	Z9Z9	102	20	3.0	25.000
0399	0402407	750	Z9Z9	106	20	3.0	25.000
0400	0402407	750	Z9Z9	102	20	.8	25.000
0401	0402407	750	Z9Z9	605	20	3.0	25.000
0402	0402407	70	Z9Z9	106	20	4.0	25.000
0403	0402407	70	Z9Z9	102	20	4.0	25.000
0404	0402407	70	Z9Z9	106	20	4.0	25.000
0405	0402407	70	Z9Z9	102	20	.8	25.000
0406	0402407	70	Z9Z9	106	20	4.0	25.000
0407	0402407	750	Z9Z9	102	20	.5	25.000
0408	0402407	750	Z9Z9	605	20	3.0	25.000
0409	0402407	750	Z9Z9	102	20	.5	25.000
0410	0402407	750	Z9Z9	102	20	.5	25.000
0411	0402407	750	Z9Z9	106	20	3.0	25.000
0412	0402407	750	Z9Z9	106	20	.8	25.000
0413	0402407	750	Z9Z9	106	20	3.0	25.000
0414	0402407	750	Z9Z9	102	20	3.0	25.000
0415	0402407	750	Z9Z9	106	20	3.0	25.000
0416	0000000	750	Z9Z9	106	20	2.0	25.000
0417	0000000	750	Z9Z9	102	20	2.0	25.000
0418	0000000	750	Z9Z9	106	20	2.0	25.000
0419	0000000	750	Z9Z9	102	20	.8	25.000
0420	0000000	750	Z9Z9	106	20	1.0	25.000
0421	0000000	70	Z9Z9	102	20	1.0	25.000
0422	0000000	70	Z9Z9	106	20	1.0	25.000
0423	0000000	70	Z9Z9	102	20	.8	25.000
0424	0000000	70	Z9Z9	106	20	2.0	25.000
0425	0000000	70	Z9Z9	102	20	2.0	25.000
0426	0000000	70	Z9Z9	106	20	2.0	25.000
0427	0000000	70	Z9Z9	102	20	1.0	25.000
0428	0401021	70	Z9Z9	102	20	1.0	25.000
0429	0401021	70	Z9Z9	106	20	1.0	25.000
0430	0401021	70	Z9Z9	507	20	3.0	25.000
0431	0401021	70	Z9Z9	508	20	3.0	25.000
0432	0401021	70	Z9Z9	106	20	.8	25.000
0433	0401021	70	Z9Z9	106	20	2.0	25.000
0434	0401021	70	Z9Z9	102	20	2.0	25.000
0435	0401021	70	Z9Z9	106	20	2.0	25.000
0436	0403504	750	Z9Z9	106	20	3.0	25.000
0437	0403504	750	Z9Z9	102	20	3.0	25.000
0438	0403504	750	Z9Z9	106	20	3.0	25.000
0439	0403504	750	Z9Z9	102	20	.8	25.000
0440	0403504	750	Z9Z9	106	20	3.0	25.000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0441	0403504	750	Z929	102	20	3.0	25,000
0442	0403504	750	Z929	106	20	3.0	25,000
0443	0403504	750	Z929	106	20	3.0	25,000
0444	0403504	750	Z929	106	20	3.0	25,000
0445	0403504	750	Z929	106	20	1.5	25,000
0446	0403504	750	Z929	106	20	.8	25,000
0447	0403504	750	Z929	102	20	1.5	25,000
0448	0403504	750	Z929	106	20	1.5	25,000
0449	0403504	750	Z929	106	20	.8	25,000
0450	0403504	750	Z929	106	20	1.5	25,000
0451	0403504	750	Z929	106	20	1.0	25,000
0452	0403504	750	Z929	106	20	.5	25,000
0453	0403504	750	Z929	106	20	1.0	25,000
0454	0403504	750	Z929	407	20	6.0	25,000
0455	0403504	750	Z929	000	20	6.0	25,000
0456	0403504	750	Z929	106	20	2.0	25,000
0457	0403504	750	Z929	102	20	2.0	25,000
0458	0403504	750	Z929	407	20	6.0	25,000
0459	0403504	750	Z929	106	20	1.0	25,000
0460	0403504	750	Z929	106	20	1.5	25,000
0461	0403504	750	Z929	106	20	.5	25,000
0462	0403504	750	Z929	106	20	1.0	25,000
0463	0403504	750	Z929	106	20	3.0	25,000
0464	0403504	750	Z929	102	20	3.0	25,000
0465	0403504	750	Z929	106	20	3.0	25,000
0466	0403504	750	Z929	106	20	.8	25,000
0467	0403504	750	Z929	106	20	3.0	25,000
0468	0403504	750	Z929	102	20	3.0	25,000
0469	0403504	750	Z929	106	20	3.0	25,000
0470	0403504	750	Z929	106	20	.0	25,000
0471	0403504	750	Z929	106	20	.0	25,000
0472	0403504	750	Z929	106	20	.0	25,000
0473	0403504	750	Z929	106	20	1.0	25,000
0474	0403504	750	Z929	106	20	.8	25,000
0475	0403504	750	Z929	106	20	.0	25,000
0476	0403504	750	Z929	106	20	.0	25,000
0477	0403504	750	Z929	106	20	.0	25,000
0478	0403504	750	Z929	106	20	.5	25,000
0479	0403504	750	Z929	106	20	1.0	25,000
0480	0403504	750	Z929	106	20	.5	25,000
0481	0403504	750	Z929	106	20	1.5	25,000
0482	0403504	750	Z929	106	20	1.0	25,000
0483	0403504	750	Z929	106	20	3.0	25,000
0484	0403504	750	Z929	102	20	3.0	25,000
0485	0403504	750	Z929	106	20	3.0	25,000
0486	0403504	750	Z929	102	20	.8	25,000
0487	0403504	750	Z929	106	20	3.0	25,000
0488	0403504	750	Z929	102	20	3.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0489	0403504	750	Z9Z9	106	20	3.0	25,000
0490	0403504	750	Z9Z9	106	20	.0	25,000
0491	0403504	750	Z9Z9	106	20	.0	25,000
0492	0403504	750	Z9Z9	106	20	1.5	25,000
0493	0403504	750	Z9Z9	106	20	.8	25,000
0494	0403504	750	Z9Z9	106	20	1.5	25,000
0495	0403504	750	Z9Z9	106	20	1.5	25,000
0496	0403504	750	Z9Z9	106	20	.8	25,000
0497	0403504	750	Z9Z9	106	20	1.5	25,000
0498	0403504	750	Z9Z9	106	20	1.0	25,000
0499	0403504	750	Z9Z9	106	20	.5	25,000
0500	0403504	750	Z9Z9	106	20	1.0	25,000
0501	0403504	750	Z9Z9	407	20	6.0	25,000
0502	0403504	750	Z9Z9	000	20	6.0	25,000
0503	0403504	750	Z9Z9	106	20	2.0	25,000
0504	0403504	750	Z9Z9	102	20	2.0	25,000
0505	0403504	750	Z9Z9	407	20	6.0	25,000
0506	0403504	750	Z9Z9	106	20	1.5	25,000
0507	0403504	750	Z9Z9	106	20	.5	25,000
0508	0403504	750	Z9Z9	106	20	1.0	25,000
0509	0403504	750	Z9Z9	106	20	3.0	25,000
0510	0403504	750	Z9Z9	102	20	3.0	25,000
0511	0403504	750	Z9Z9	106	20	3.0	25,000
0512	0403504	750	Z9Z9	106	20	.8	25,000
0513	0403504	750	Z9Z9	106	20	3.0	25,000
0514	0403504	750	Z9Z9	102	20	3.0	25,000
0515	0403504	750	Z9Z9	106	20	3.0	25,000
0516	0403504	750	Z9Z9	106	20	.0	25,000
0517	0403504	750	Z9Z9	106	20	.0	25,000
0518	0403504	750	Z9Z9	106	20	.0	25,000
0519	0403504	750	Z9Z9	106	20	1.0	25,000
0520	0403504	750	Z9Z9	106	20	.8	25,000
0521	0403504	750	Z9Z9	106	20	.0	25,000
0522	0403504	750	Z9Z9	106	20	.0	25,000
0523	0403504	750	Z9Z9	106	20	.0	25,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0524	0403505		Z9Z9	106	00	.8	
0525	0403505	750	Z9Z9	106	20	.8	300
0526	0403505	750	Z9Z9	106	20	.5	300
0527	0403505	750	Z9Z9	106	20	.8	300
0528	0403505	750	Z9Z9	106	20	.8	300
0529	0403505	750	Z9Z9	106	20	.5	300
0530	0403505	750	Z9Z9	106	20	.8	300
0531	0403505	750	Z9Z9	106	20	.8	300
0532	0403505	750	Z9Z9	106	20	.5	300
0533	0403505	750	Z9Z9	106	20	.8	300
0534	0403505	750	Z9Z9	106	20	.8	300
0535	0403505	750	Z9Z9	106	20	.5	300
0536	0403505	750	Z9Z9	106	20	.8	300

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0537	0403505	750	Z929	106	20	.8	300
0538	0403505	750	Z929	106	20	.5	300
0539	0403505	750	Z929	106	20	.8	300
0540	0401214	750	Z929	106	20	.8	2,000
0541	0401214	750	Z929	106	20	.4	2,000
0542	0401214	750	Z929	106	20	.4	2,000
0543	0401214	750	Z929	106	20	.8	2,000
0544	0401214	750	Z929	106	20	.8	2,000
0545	0401214	750	Z929	106	20	.4	2,000
0546	0401214	750	Z929	106	20	.4	2,000
0547	0401214	750	Z929	106	20	.8	2,000
0548	0000000	750	Z929	106	20	1.0	2,000
0549	0000000	750	Z929	102	20	1.0	2,000
0550	0000000	550	Z929	106	20	.8	2,000
0551	0000000	550	Z929	106	20	1.0	2,000
0552	0000000	550	Z929	106	20	.5	2,000
0553	0000000	550	Z929	106	20	.8	2,000
0554	0000000	750	Z929	106	20	.8	25,000
0555	0000000	750	Z929	106	20	.5	25,000
0556	0000000	750	Z929	106	20	3.0	25,000
0557	0000000	750	Z929	102	20	3.0	25,000
0558	0000000	750	Z929	106	20	3.0	25,000
0559	0000000	750	Z929	106	20	.8	25,000
0560	0000000	750	Z929	106	20	1.0	25,000
0561	0000000	750	Z929	102	20	1.0	25,000
0562	0000000	550	Z929	106	20	1.0	25,000
0563	0000000	550	Z929	106	20	.8	25,000
0564	0000000	550	Z929	102	20	.8	25,000
0565	0000000	550	Z929	106	20	3.0	25,000
0566	0000000	550	Z929	102	20	3.0	25,000
0567	0000000	550	Z929	106	20	3.0	25,000
0568	0000000	550	Z929	106	20	.8	25,000
0569	0000000	550	Z929	102	20	.8	25,000
0570	0000000	550	Z929	106	20	.8	25,000
0571	0000000	550	Z929	106	20	2.0	25,000
0572	0000000	550	Z929	102	20	2.0	25,000
0573	0000000	550	Z929	106	20	2.0	25,000
0574	0000000	550	Z929	106	20	.8	25,000
0575	0000000	550	Z929	106	20	.8	25,000
0576	0000000	750	Z929	106	10	.5	25,000
0577	0000000	750	Z929	106	10	4.0	25,000
0578	0000000	750	Z929	102	10	4.0	25,000
0579	0000000	750	Z929	106	10	4.0	25,000
0580	0000000	750	Z929	106	10	.8	25,000
0581	0000000	750	Z929	106	10	3.0	25,000
0582	0000000	750	Z929	102	10	3.0	25,000
0583	0000000	690	Z929	106	10	3.0	25,000
0584	0000000	690	Z929	106	10	.8	25,000
0585	0000000	690	Z929	106	10	4.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0586	0000000	690	Z9Z9	102	10	4.0	25,000
0587	0000000	690	Z9Z9	106	10	4.0	25,000
0588	0000000	690	Z9Z9	106	10	.5	25,000
0589	0000000	690	Z9Z9	106	10	3.0	25,000
0590	0000000	690	Z9Z9	102	10	3.0	25,000
0591	0000000	690	Z9Z9	106	10	3.0	25,000
0592	0403502	690	Z9Z9	106	10	4.0	25,000
0593	0403502	690	Z9Z9	102	10	4.0	25,000
0594	0403502	690	Z9Z9	106	10	4.0	25,000
0595	0403502	690	Z9Z9	106	10	.8	25,000
0596	0403502	690	Z9Z9	106	10	4.0	25,000
0597	0403502	690	Z9Z9	102	10	4.0	25,000
0598	0403502	690	Z9Z9	106	10	4.0	25,000
0599	0403502	690	Z9Z9	106	10	2.0	25,000
0600	0403502	690	Z9Z9	106	10	.0	25,000
0601	0403502	690	Z9Z9	106	10	.0	25,000
0602	0403502	690	Z9Z9	106	10	.0	25,000
0603	0403502	690	Z9Z9	106	10	1.0	25,000
0604	0403502	690	Z9Z9	106	10	.8	25,000
0605	0403502	690	Z9Z9	106	10	4.0	25,000
0606	0403502	690	Z9Z9	106	10	1.5	25,000
0607	0403502	690	Z9Z9	407	10	4.0	25,000
0608	0403502	690	Z9Z9	106	10	1.5	25,000
0609	0403502	690	Z9Z9	106	10	.5	25,000
0610	0403502	690	Z9Z9	106	10	1.0	25,000
0611	0403502	690	Z9Z9	106	10	.0	25,000
0612	0403502	690	Z9Z9	106	10	.0	25,000
0613	0403502	690	Z9Z9	106	10	.0	25,000
0614	0403502	690	Z9Z9	106	10	.0	25,000
0615	0403502	690	Z9Z9	106	10	.0	25,000
0616	0403502	690	Z9Z9	106	10	.0	25,000
0617	0403502	690	Z9Z9	106	10	4.0	25,000
0618	0403502	690	Z9Z9	102	10	4.0	25,000
0619	0403502	690	Z9Z9	106	10	4.0	25,000
0620	0403502	690	Z9Z9	106	10	2.0	25,000
0621	0403502	690	Z9Z9	106	10	.0	25,000
0622	0403502	690	Z9Z9	106	10	.0	25,000
0623	0403502	690	Z9Z9	106	10	.0	25,000
0624	0403502	690	Z9Z9	106	10	1.0	25,000
0625	0403502	690	Z9Z9	106	10	.8	25,000
0626	0403502	690	Z9Z9	106	10	4.0	25,000
0627	0403502	690	Z9Z9	106	10	1.5	25,000
0628	0403502	690	Z9Z9	407	10	4.0	25,000
0629	0403502	690	Z9Z9	106	10	1.5	25,000
0630	0403502	690	Z9Z9	106	10	.5	25,000
0631	0403502	690	Z9Z9	106	10	1.0	25,000
0632	0403502	690	Z9Z9	106	10	.0	25,000
0633	0403502	690	Z9Z9	106	10	.0	25,000
0634	0403502	690	Z9Z9	106	10	.0	25,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0635	0403502	690	Z9Z9	106	10	.0	25,000
0636	0403502	690	Z9Z9	106	10	.0	25,000
0637	0403502	690	Z9Z9	106	10	.0	25,000
0638	0403502	690	Z9Z9	106	10	4.0	25,000
0639	0403502	690	Z9Z9	102	10	4.0	25,000
0640	0403502	690	Z9Z9	106	10	4.0	25,000
0641	0401211	690	Z9Z9	106	10	1.0	25,000
0642	0401211	690	Z9Z9	106	10	4.0	25,000
0643	0401211	690	Z9Z9	102	10	4.0	25,000
0644	0401211	690	Z9Z9	106	10	4.0	25,000
0645	0401211	690	Z9Z9	707	10	4.0	25,000
0646	0401211	690	Z9Z9	106	10	.8	25,000
0647	0401211	690	Z9Z9	106	10	.8	25,000
0648	0401211	690	Z9Z9	106	10	.8	25,000
0649	0401211	690	Z9Z9	106	10	.8	25,000
0650	0401211	690	Z9Z9	106	10	.8	25,000
0651	0401211	690	Z9Z9	708	10	4.0	25,000
0652	0401211	690	Z9Z9	106	10	4.0	25,000
0653	0401211	690	Z9Z9	102	10	4.0	25,000
0654	0401211	690	Z9Z9	106	10	4.0	25,000
0655	0401211	690	Z9Z9	106	10	.5	25,000
0656	0000000	690	Z9Z9	106	10	4.0	25,000
0657	0000000	690	Z9Z9	102	10	4.0	25,000
0658	0000000	690	Z9Z9	106	10	4.0	25,000
0659	0000000	690	Z9Z9	106	10	.8	25,000
0660	0000000	690	Z9Z9	102	10	.8	25,000
0661	0000000	690	Z9Z9	106	10	2.0	25,000
0662	0000000	550	Z9Z9	102	10	2.0	25,000
0663	0000000	550	Z9Z9	106	10	2.0	25,000
0664	0000000	550	Z9Z9	106	10	.8	25,000
0665	0000000	550	Z9Z9	102	10	.8	25,000
0666	0000000	550	Z9Z9	106	10	4.0	25,000
0667	0000000	550	Z9Z9	102	10	4.0	25,000
0668	0000000	550	Z9Z9	106	10	4.0	25,000
0669	0000000	550	Z9Z9	106	10	.5	25,000
0670	0000000	550	Z9Z9	102	10	.5	25,000
0671	0000000	550	Z9Z9	106	10	3.0	25,000
0672	0000000	550	Z9Z9	102	10	3.0	25,000
0673	0000000	550	Z9Z9	106	10	3.0	25,000
0674	0000000	670	Z9Z9	102	30	1.0	200
0675	0000000	670	Z9Z9	102	30	.5	200
0676	0000000	550	Z9Z9	102	30	.0	200
0677	0000000	550	Z9Z9	106	30	.8	200
0678	0000000	550	Z9Z9	102	30	.8	200
0679	0000000	550	Z9Z9	106	30	1.0	200
0680	0000000	550	Z9Z9	102	30	1.0	200
0681	0000000	550	Z9Z9	106	30	1.0	200
0682	0000000	550	Z9Z9	106	30	.5	200
0683	0000000	550	Z9Z9	106	30	.5	200

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0684	0000000	550	Z9Z9	102	30	.5	200
0685	0000000	550	Z9Z9	106	30	.5	200
0686	0000000	550	Z9Z9	106	30	.5	200
0687	0000000	550	Z9Z9	102	30	.5	200
0688	0403505	550	Z9Z9	106	30	.5	200
0689	0403505	550	Z9Z9	102	30	.5	200
0690	0403505	550	Z9Z9	106	30	1.0	200
0691	0403505	550	Z9Z9	102	30	1.0	200
0692	0403505	550	Z9Z9	106	30	1.0	200
0693	0403505	550	Z9Z9	106	30	.5	200
0694	0403505	550	Z9Z9	102	30	.5	200
0695	0403505	550	Z9Z9	106	30	1.0	200
0696	0403505	550	Z9Z9	102	30	1.0	200
0697	0403505	550	Z9Z9	106	30	1.0	200
0698	0000000	650	Z9Z9	106	20	.5	300
0699	0000000	650	Z9Z9	102	20	1.0	300
0700	0000000	650	Z9Z9	106	20	.5	300
0701	0403509	650	Z9Z9	410	20	3.0	300
0702	0403509	650	Z9Z9	406	20	3.0	300
0703	0403509	650	Z9Z9	106	20	1.0	300
0704	0403509	650	Z9Z9	106	20	1.0	300
0705	0403509	650	Z9Z9	106	20	1.0	300
0706	0403509	650	Z9Z9	106	20	1.0	300
0707	0403509	650	Z9Z9	106	20	.5	300
0708	0403509	650	Z9Z9	106	20	.8	300
0709	0403509	650	Z9Z9	106	20	.8	300
0710	0403509	650	Z9Z9	408	20	2.0	300
0711	0403509	650	Z9Z9	106	20	2.0	300
0712	0403509	650	Z9Z9	408	20	2.0	300
0713	0403510	650	Z9Z9	106	20	2.0	300
0714	0403510	650	Z9Z9	106	20	2.0	300
0715	0403510	650	Z9Z9	407	20	2.0	300
0716	0403510	650	Z9Z9	106	20	1.0	300
0717	0403510	650	Z9Z9	106	20	1.0	300
0718	0403510	650	Z9Z9	106	20	2.0	300
0719	0403510	650	Z9Z9	106	20	2.0	300
0720	0403510	650	Z9Z9	407	20	2.0	300
0721	0403510	650	Z9Z9	106	20	1.0	300
0722	0403510	650	Z9Z9	106	20	1.0	300
0723	0403510	650	Z9Z9	106	20	.5	300
0724	0403510	650	Z9Z9	408	20	2.0	300
0725	0403510	650	Z9Z9	106	20	2.0	300
0726	0403510	650	Z9Z9	408	20	2.0	300
0727	0403510	650	Z9Z9	106	20	2.0	300
0728	0403510	650	Z9Z9	408	20	1.5	300
0729	0403510	550	Z9Z9	408	20	2.0	300
0730	0403510	550	Z9Z9	106	20	2.0	300
0731	0403510	550	Z9Z9	408	20	2.0	300
0732	0403510	550	Z9Z9	106	20	2.0	300

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0733	0403510	550	Z9Z9	40A	20	1.5	300
0734	0000000	750	Z9Z9	102	20	1.0	1,000
0735	0000000	750	Z9Z9	102	20	.8	1,000
0736	0000000	750	Z9Z9	102	20	.0	1,000
0737	0000000	550	Z9Z9	102	20	.8	1,000
0738	0000000	550	Z9Z9	102	20	1.0	1,000
0739	0000000	550	Z9Z9	102	20	.8	1,000
0740	0000000	700	Z9Z9	102	20	.5	300
0741	0000000	700	Z9Z9	102	20	.5	300
0742	0000000	700	Z9Z9	102	20	1.5	300
0743	0000000	700	Z9Z9	102	20	.8	300
0744	0000000	700	Z9Z9	102	20	.0	300
0745	0000000	550	Z9Z9	102	20	.8	300
0746	0000000	550	Z9Z9	102	20	1.5	300
0747	0000000	550	Z9Z9	102	20	.8	300
0748	0000000	550	Z9Z9	102	20	.5	300
0749	0403505	550	Z9Z9	106	20	10.0	5,000
0750	0403505	550	Z9Z9	106	20	10.0	5,000
0751	0403505	550	Z9Z9	102	20	1.0	5,000
0752	0403505	550	Z9Z9	106	20	10.0	5,000
0753	0403505	550	Z9Z9	106	20	10.0	5,000
0754	0403505	550	Z9Z9	102	20	1.0	5,000
0755	0403505	550	Z9Z9	106	20	10.0	5,000
0756	0403505	550	Z9Z9	106	20	10.0	5,000
0757	0403505	550	Z9Z9	102	20	1.0	5,000
0758	0403505	550	Z9Z9	106	20	10.0	5,000
0759	0403505	550	Z9Z9	106	20	10.0	5,000
0760	0403505	550	Z9Z9	102	20	1.0	5,000
0761	0403505	550	Z9Z9	106	20	10.0	5,000
0762	0403505	550	Z9Z9	106	20	10.0	5,000
0763	0403505	550	Z9Z9	102	20	1.0	5,000
0764	0403505	550	Z9Z9	106	20	2.0	5,000
0765	0403505	550	Z9Z9	106	20	2.0	5,000
0766	0403505	550	Z9Z9	106	20	2.0	5,000
0767	0403505	550	Z9Z9	106	20	2.0	5,000
0768	0403505	550	Z9Z9	106	20	2.0	5,000
0769	0403505	550	Z9Z9	106	20	2.0	5,000
0770	0403505	550	Z9Z9	410	20	1.0	
0771	0403505	550	Z9Z9	410	20	1.0	
0772	0403505	550	Z9Z9	406	20	2.0	
0773	0403526	210	Z9Z9	408	15	2.0	2,000
0774	0403526	210	Z9Z9	102	15	1.5	2,000
0775	0403526	210	Z9Z9	106	15	.5	2,000
0776	0403526	210	Z9Z9	102	15	1.5	2,000
0777	0403526	210	Z9Z9	406	15	2.0	2,000
0778	0403526	210	Z9Z9	102	15	.8	2,000
0779	0403526	210	Z9Z9	102	15	.5	2,000
0780	0403526	210	Z9Z9	102	15	.5	2,000
0781	0403526	210	Z9Z9	106	15	1.0	2,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0782	0403526	210	Z9Z9	106	15	.5	2,000
0783	0000000	210	Z9Z9	106	15	2.0	2,000
0784	0000000	210	Z9Z9	102	15	2.0	2,000
0786	0000000	210	Z9Z9	102	15	.8	2,000
0787	0000000	210	Z9Z9	106	15	1.5	2,000
0788	0000000	210	Z9Z9	102	15	1.5	2,000
0789	0000000	2	Z9Z9	106	15	1.5	2,000
0790	0000000	2	Z9Z9	102	15	.8	2,000
0791	0000000	2	Z9Z9	106	15	2.0	2,000
0792	0000000	2	Z9Z9	102	15	2.0	2,000
0793	0000000	2	Z9Z9	106	15	2.0	2,000
0794	0000000	210	Z9Z9	102	15	1.0	2,000
0795	0403526	210	Z9Z9	106	15	2.0	2,000
0796	0403526	210	Z9Z9	102	15	2.0	2,000
0797	0403526	210	Z9Z9	106	15	2.0	2,000
0798	0400604	210	Z9Z9	106	15	2.0	2,000
0799	0400604	210	Z9Z9	102	15	2.0	2,000
0800	0400604	210	Z9Z9	106	15	2.0	2,000
0801	0400604	210	Z9Z9	303	15	.0	2,000
0802	0400604	210	Z9Z9	106	15	.8	2,000
0803	0400604	210	Z9Z9	807	15	2.0	2,000
0804	0400604	325	Z9Z9	808	15	2.0	2,000
0805	0400604	325	Z9Z9	809	15	.8	2,000
0806	0400604	325	Z9Z9	304	15	2.0	2,000
0807	0400604	325	Z9Z9	106	15	.8	2,000
0808	0400604	325	Z9Z9	102	15	.8	2,000
0809	0400604	325	Z9Z9	106	15	.8	2,000
0810	0400604	325	Z9Z9	102	15	.0	2,000
0811	0400604	325	Z9Z9	106	15	2.0	2,000
0812	0400604	325	Z9Z9	102	15	2.0	2,000
0813	0400604	325	Z9Z9	106	15	2.0	2,000
0814	0400604	210	Z9Z9	106	15	2.0	2,000
0815	0400604	210	Z9Z9	102	15	2.0	2,000
0816	0400604	210	Z9Z9	106	15	2.0	2,000
0817	0400604	210	Z9Z9	303	15	2.0	2,000
0818	0400604	210	Z9Z9	106	15	.8	2,000
0819	0400604	210	Z9Z9	807	15	.0	2,000
0820	0400604	325	Z9Z9	808	15	.0	2,000
0821	0400604	325	Z9Z9	106	15	.8	2,000
0822	0400604	325	Z9Z9	304	15	2.0	2,000
0823	0400604	325	Z9Z9	106	15	.8	2,000
0824	0400604	325	Z9Z9	102	15	.8	2,000
0825	0400604	325	Z9Z9	106	15	.8	2,000
0826	0400604	325	Z9Z9	102	15	.0	2,000
0827	0400604	325	Z9Z9	106	15	2.0	2,000
0828	0400604	325	Z9Z9	102	15	2.0	2,000
0829	0400604	325	Z9Z9	106	15	2.0	2,000
0830	0401008	325	Z9Z9	106	15	2.0	2,000
0831	0401008	325	Z9Z9	102	15	2.0	2,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0832	0401008	325	Z929	106	15	2.0	2,000
0833	0401008	325	Z929	106	15	2.0	2,000
0834	0401008	325	Z929	106	15	.8	2,000
0835	0401008	325	Z929	507	15	3.0	2,000
0836	0401008	325	Z929	508	15	3.0	2,000
0837	0401008	325	Z929	000	15	3.0	2,000
0838	0401008	325	Z929	102	15	1.0	2,000
0839	0401008	325	Z929	106	15	1.0	2,000
0840	0401008	325	Z929	106	15	.0	2,000
0841	0403519	325	Z929	406	15	3.0	2,000
0842	0403519	325	Z929	106	15	.8	2,000
0843	0403519	325	Z929	106	15	.8	2,000
0844	0403519	325	Z929	106	15	.8	2,000
0845	0403519	325	Z929	106	15	.8	2,000
0846	0403519	325	Z929	106	15	.5	2,000
0847	0403519	325	Z929	106	15	1.0	2,000
0848	0403519	325	Z929	106	15	.5	2,000
0849	0403519	325	Z929	106	15	2.0	2,000
0850	0403519	325	Z929	102	15	2.0	2,000
0851	0403519	325	Z929	106	15	2.0	2,000
0852	0403519	325	Z929	106	15	.5	2,000
0853	0000000	325	Z929	106	15	15.6	2,000
0854	0000000	325	Z929	102	15	.8	2,000
0855	0000000	325	Z929	106	15	1.0	2,000
0856	0000000	200	Z929	102	20	1.0	600
0857	0000000	200	Z929	106	20	1.0	600
0858	0000000	200	Z929	102	20	.8	600
0859	0000000	200	Z929	102	20	1.5	600
0860	0000000	200	Z929	106	20	1.5	600
0861	0000000	200	Z929	106	20	1.5	600
0862	0000000	200	Z929	106	20	1.5	600
0863	0000000	200	Z929	106	20	.8	600
0864	0000000	200	Z929	106	20	1.0	600
0865	0000000	200	Z929	102	20	1.0	600
0866	0000000	3	Z929	106	20	1.0	600
0867	0000000	3	Z929	102	20	.8	600
0868	0000000	3	Z929	102	20	1.5	600
0869	0000000	3	Z929	102	20	1.0	600
0870	0401010	3	Z929	102	20	.5	600
0871	0000000	325	Z929	106	15	3.0	2,000
0872	0000000	325	Z929	102	15	3.0	2,000
0873	0000000	325	Z929	106	15	3.0	2,000
0874	0000000	325	Z929	102	15	.8	2,000
0875	0000000	325	Z929	106	15	3.0	2,000
0876	0000000	325	Z929	102	15	3.0	2,000
0877	0000000	325	Z929	106	15	3.0	2,000
0878	0000000	325	Z929	102	15	.8	2,000
0879	0000000	325	Z929	106	15	3.0	2,000
0880	0000000	325	Z929	102	15	3.0	2,000

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CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0881	0000000	325	Z9Z9	106	15	3.0	2,000
0882	0000000	325	Z9Z9	106	15	2.0	2,000
0883	0000000	325	Z9Z9	102	15	2.0	2,000
0884	0000000	325	Z9Z9	106	15	2.0	2,000
0885	0000000	325	Z9Z9	106	15	.5	2,000
0886	0000000	325	Z9Z9	102	15	1.5	2,000
0887	0000000	325	Z9Z9	102	15	.8	2,000
0888	0000000	325	Z9Z9	106	15	1.0	2,000
0889	0000000	325	Z9Z9	102	15	1.0	2,000
0890	0000000	110	Z9Z9	106	10	1.0	1,000
0891	0000000	110	Z9Z9	102	10	.8	1,000
0892	0000000	110	Z9Z9	102	10	1.5	1,000
0893	0000000	110	Z9Z9	106	10	1.5	1,000
0894	0000000	110	Z9Z9	106	10	1.0	1,000
0895	0000000	110	Z9Z9	102	10	.5	1,000
0896	0000000	110	Z9Z9	106	10	.5	1,000
0897	0000000	325	Z9Z9	106	15	1.5	1,000
089A	0000000	325	Z9Z9	102	15	.8	1,000
0899	0000000	325	Z9Z9	106	15	1.0	1,000
0900	0000000	210	Z9Z9	102	15	1.0	1,000
0901	0000000	210	Z9Z9	106	15	1.0	1,000
0902	0000000	210	Z9Z9	102	15	.8	1,000
0903	0000000	210	Z9Z9	102	15	1.5	1,000
0904	0000000	210	Z9Z9	106	15	1.5	1,000
0905	0401022	210	Z9Z9	507	15	2.0	1,000
0906	0401022	210	Z9Z9	102	15	1.5	1,000
0907	0401022	210	Z9Z9	106	15	1.5	1,000
0908	0401022	210	Z9Z9	106	15	1.0	1,000
0909	0401022	210	Z9Z9	508	15	2.0	1,000
0910	0401022	210	Z9Z9	106	15	2.0	1,000
0911	0401022	210	Z9Z9	102	15	2.0	1,000
0912	0401022	210	Z9Z9	106	15	2.0	1,000
0913	0403505	550	Z9Z9	106	20	.8	500
0914	0403505	550	Z9Z9	106	20	2.0	500
0915	0403505	550	Z9Z9	106	20	2.0	500
0916	0403505	550	Z9Z9	102	20	2.0	500
0917	0403505	550	Z9Z9	106	20	2.0	500
0918	0403505	550	Z9Z9	406	20	2.0	500
0919	0403505	550	Z9Z9	106	20	.8	500
0920	0403505	550	Z9Z9	106	20	1.5	500
0921	0403505	550	Z9Z9	106	20	1.5	500
0922	0403505	550	Z9Z9	106	20	.8	500
0923	0403505	550	Z9Z9	106	20	2.0	500
0924	0403505	550	Z9Z9	106	20	2.0	500
0925	0403505	550	Z9Z9	102	20	2.0	500
0926	0403505	550	Z9Z9	106	20	2.0	500
0927	0403505	550	Z9Z9	106	20	2.0	500
0928	0403505	550	Z9Z9	106	20	.8	500
0929	0403505	550	Z9Z9	106	20	1.5	500

VOLATILE COMPOUNDS REPORTING
MASTER LIST OF CHECK POINTS
PROJECT TO DATE

CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0930	0403505	550	Z9Z9	106	20	1.5	500
0931	0403505	550	Z9Z9	106	20	.8	500
0932	0403505	550	Z9Z9	106	20	2.0	500
0933	0403505	550	Z9Z9	106	20	2.0	500
0934	0403505	550	Z9Z9	102	20	2.0	500
0935	0403505	550	Z9Z9	106	20	2.0	500
0936	0403505	550	Z9Z9	106	20	2.0	500
0937	0403505	550	Z9Z9	106	20	.8	500
0938	0403505	550	Z9Z9	106	20	1.5	500
0939	0403505	550	Z9Z9	106	20	1.5	500
0940	0402401	550	Z9Z9	106	20	.5	500
0941	0402401	550	Z9Z9	106	20	1.0	500
0946	0000000	750	Z9Z9	102	30	1.0	
0947	0000000	750	Z9Z9	102	30	1.0	
0948	0000000	550	Z9Z9	106	30	1.0	
0949	0000000	550	Z9Z9	102	30	1.0	
0950	0000000	550	Z9Z9	106	30	1.0	
0951	0000000	550	Z9Z9	106	30	.8	
0952	0000000	550	Z9Z9	102	30	.8	
0953	0000000	550	Z9Z9	106	30	.8	
0954	0000000	750	Z9Z9	102	40	1.0	1,000
0955	0000000	750	Z9Z9	102	40	.8	1,000
0956	0000000	750	Z9Z9	102	40	1.0	1,000
0957	0000000	550	Z9Z9	102	40	.8	1,000
0958	0000000	550	Z9Z9	102	40	1.0	1,000
0959	0000000	550	Z9Z9	102	40	.5	1,000
0960	0000000	550	Z9Z9	106	30	1.0	
0961	0000000	550	Z9Z9	102	30	1.0	
0962	0000000	550	Z9Z9	106	30	1.0	
0963	0000000	550	Z9Z9	106	30	.5	
0964	0000000	550	Z9Z9	102	30	.5	
0965	0000000	550	Z9Z9	106	30	1.0	
0966	0000000	550	Z9Z9	102	30	1.0	
0967	0000000	550	Z9Z9	106	30	1.0	
0968	0403544	5	Z9Z9	106	20	20.0	25,000
0969	0403544	5	Z9Z9	102	20	20.0	25,000
0970	0403544	5	Z9Z9	000	20	20.0	25,000
0971	0403544	5	Z9Z9	106	20	20.0	25,000
0972	0403544	5	Z9Z9	102	20	20.0	25,000
0973	0403544	5	Z9Z9	000	20	2.0	25,000
0974	0403544	5	Z9Z9	106	20	.5	25,000
0975	0403544	5	Z9Z9	000	20	2.0	25,000
0976	0403544	5	Z9Z9	106	20	2.0	25,000
0977	0403544	5	Z9Z9	102	20	1.5	25,000
0978	0402002	5	Z9Z9	106	15	10.0	2,000
0979	0400901	5	Z9Z9	907	20	.0	25,000
0980	0400901	5	Z9Z9	907	20	.0	25,000
0981	0400901	5	Z9Z9	906	20	.0	25,000
0982	0400901	5	Z9Z9	000	20	.0	25,000

VOLATILE COMPOUNDS REPORTING
MASTER LIST OF CHECK POINTS
PROJECT TO DATE

CHECK POINT SEQ	EQUIP NO.	PSI	GRID NO.	LEAK TYPE CODE	SVC CODE	SIZE	FLOW RATE
0983	0400801	5	Z9Z9	906	20	6.0	25,000
0984	0400A01	5	Z9Z9	906	20	6.0	25,000
0985	0400901	5	Z9Z9	106	20	6.0	25,000
0986	0400A01	5	Z9Z9	906	20	6.0	25,000
0987	0400801	5	Z9Z9	906	20	3.0	25,000
0988	0400A01	5	Z9Z9	102	20	3.0	25,000
0989	0400801	5	Z9Z9	906	20	3.0	25,000
0990	0400A01	5	Z9Z9	906	20	8.0	25,000
0991	0400A01	5	Z9Z9	906	20	8.0	25,000
0992	0400A01	5	Z9Z9	906	20	10.0	25,000
0993	0400901	5	Z9Z9	906	20	10.0	25,000
0994	0400801	5	Z9Z9	906	20	10.0	25,000
0995	0400801	5	Z9Z9	906	20	8.0	25,000
0996	0400A01	5	Z9Z9	906	20	8.0	25,000
0997	0400801	5	Z9Z9	906	20	.0	25,000
0998	0400A01	5	Z9Z9	906	20	.0	25,000
0999	0403551	5	Z9Z9	407	20	10.0	25,000
1000	0403551	5	Z9Z9	407	20	3.0	25,000

APPENDIX C

LISTING OF SCREENING TEST RESULTS

A complete list of the screening test results is given in this Appendix. They are listed by point, source, and service codes. These codes are given in the first two pages. A blank value in the table indicates no test was conducted.

PEDCo code	Leak type code	Allied code	Description
Flange	101	Valve	Suction flange
Valve	102	Valve	Packing gland
Valve	103	Valve	Suction surge bottle
Valve	104	Valve	Discharging surge bottle
Flange	105	Valve	Discharge flange
Flange	106	Valve	Flange
Flange	107	Valve	Inlet flange
Flange	108	Valve	Outlet flange
Other	109	Valve	Level glass
Flange	201	Screen	Suction flange
Flange	303	Flange	Suction surge bottle
Flange	304	Flange	Discharge surge bottle
Flange	309	Flange	Level glass
Flange	310	Flange	Nozzle
Flange	311	Flange	Orifice plate
Flange	313	Flange	Y strainer
Flange	315	Flange	Pipe
Flange	401	Vessel	Suction flange
Flange	405	Vessel	Discharge flange
Flange	406	Vessel	Flange
Flange	407	Vessel	Inlet flange
Flange	408	Vessel	Outlet flange
Valve	410	Vessel	Nozzle
Other	413	Vessel	Clean out tee cap
Flange	414	Vessel	Clean out tee flange
Flange	506	Exchanger	Flange
Flange	507	Exchanger	Inlet flange
Flange	508	Exchanger	Outlet flange
Flange	601	Pump	Suction flange
Other	602	Pump	Packing gland
Flange	605	Pump	Discharge flange
Flange	606	Pump	Flange
Flange	607	Pump	Inlet flange
Flange	608	Pump	Clean out tee flange
Other	612	Pump	Mechanical seal
Flange	707	Filter	Inlet flange
Flange	708	Filter	Outlet flange
Flange	807	Compressor	Inlet flange
Flange	808	Compressor	Outlet flange
Other	809	Compressor	Level glass
Other	813	Compressor	Clean out tee cap
Flange	814	Compressor	Clean out tee flange
Flange	906	Dryer	Flange
Flange	907	Dryer	Inlet flange
Other	912	Dryer	Mechanical seal

SERVICE IDENTIFICATION

First two digits:

10	Ethylene
15	Ethylene 50%/Isobutane 50%
20	Isobutane
30	Hexene
40	Isopentane

Last digit:

1	Gas
0	Liquid

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
1	1C1	2C1	2C	1CC	17CC	6C	2C	2CCC
2	1C1	201	3C	30	400	150	3C	50
3	102	201	0	800	700	70	20	500
4	2C1	2C1	17C	35C	9CC	15C	3CC	3C
5	813	201	1230	30	300	100	200	30
6	2C1	201	40	0	200	80	2C	2C
7	103	201	70	0	350	1000	1000	30
8	303	201	710	0	1000	20	1000	70
9	1C3	201	56C	0	1500	20	300	10
10	103	201	0	20	10	10	60	10
11	1C3	2C1	0	0	10	10	70	10
12	1C3	201	0	25	15	20	5C	10
13	3C4	2C1	1CCCC	1CCCC	1CCCC	1CCCC	1CCCC	1CCCC
14	105	201	3000	7000	4000	1000	1CC0	1000
15	1C5	201	4000	3000	4000	1500	1000	200
16	102	201	10000	0	2000	10000	70	30
17	105	201	100	30	1500	30	50	100
18	1C2	201	10000	600	20	150	1000	10
19	1C5	201	3000	10000	10000	5000	100	2000
2C	1C5	2C1	1CCCC	1CCCC	3CCC	1CCC	1CC0	2000
21	106	201	0	70	30	100	2C	1C
22	102	201	0	0	2C	1C	1CC	1C
23	1C6	201	0	0	10	10	200	10
24	101	201	0	30	10	10	30	70
25	101	201	150	2000	400	10000	10000	30
26	1C2	201	10000	10000	20	40	70	70
27	1C2	201	0	250	250	50	60	30
28	3C3	201	0	400	5C	35	200	40
29	1C3	2C1	2CCC	3C	15C	3C	4C	1C
30	103	201	100	150	5C	200	100	0
31	104	200	10000	1000	20	150	2000	10
32	104	200	10000	60	20	10	5C	250
33	304	200	70	10000	200	10000	1000	150
34	1C2	200	10000	10000	10000	10000	7000	100
35	1C5	200	40	0	15	10	50	50
36	1C5	2CC	1CCCC	1CCCC	1CCC0	10000	100	600
37	1C5	200	50	300	200	350	200	70
38	102	200	1CCCC	1CCOC	3C	1C	7C	15CC
39	105	200	700	10000	1000	10000	100	400
40	105	200	0	0	3	10	5C	10
41	102	200	0	0	1	10	50	10
42	105	200	0	0	1	10	100	10
43	101	201	0	0	5	500	30	40
44	102	201	15C	0	3	25	20	20
45	1C1	2C1	C	C	1	25	2C	7C
46	814	201	0	30	7	20	50	20
47	813	201	1000	5000	2000	3000	100	15CC

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
48	814	201	0	30	1	10	30	10
49	102	201	20	0	1	10	30	10
50	303	201	40	0	30	15	30	10
51	103	201	50	0	30	10	30	10
52	103	201	100	0	50	10	30	10
53	104	201	10000	60	15	10	800	30
54	104	201	500	2500	10	10	40	30
55	304	201	10000	10000	10000	10000	3000	10000
56	105	201	0	1000	50	2000	500	30
57	102	201	70	0	25	20	300	400
58	105	201	150	7000	10000	10000	1000	10000
59	105	201	0	0	20	20	30	100
60	105	201	70	150	70	20	70	100
61	102	201	150	40	40	20	30	10000
62	105	201	300	10000	700	5000	400	300
63	105	201	0	0	10	30	100	50
64	102	201	0	0	70	15	100	50
65	105	201	40	20	10	50	40	70
66	101	201	300	2000	200	50	50	120
67	102	201	10000	10000	30	10	50	20
68	101	201	10000	10000	10000	10000	10000	10000
69	102	201	30	30	10	150	200	30
70	303	201	50	150	10	15	50	30
71	103	201	100	100	10000	40	60	30
72	103	201	10000	200	40	15	100	10000
73	104	200	10000	100	25		150	3000
74	104	200	150	400	700	10000	200	30
75	304	200	100	25	5000	1000	200	700
76	102	200	10000	10000	10000	10000	10000	10000
77	105	200	70	200	15	100	200	40
78	102	200	10000	10000	2000	3000	6000	5000
79	105	200	0	10	10000	500	300	10000
80	102	200	150	10000	100	50	100	1000
81	105	200	10000	10000	10000	10000	7000	500
82	105	200	0	50	10	10	50	40
83	102	200	150	50	150	10	70	200
84	105	200	0	60	10	15	50	30
85	106	201	0	0	200	15	30	15
86	102	201	0	30	700	10	20	400
87	106	201	0	20	150	10	30	20
88	407	201	0	20	150	15	0	20
89	106	201	0	20	200	10	50	10
90	408	201	0	50	200	10	30	30
91	106	201	0		100	10	50	10
92	102	201	0		80	10	45	400
93	106	201	0	40	300	10	35	20
94	102	201	0	40	250	10	60	15

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
95	106	201	0	35	350	10	60	15
96	102	201	200	0	200	20	40	15
97	102	201	300	4000	150	2500	30	5000
98	106	201	1500	300	100	15	40	70
99	102	201	200	2000	50	10	50	30
100	106	201	2000	2000	20	1000	20	500
101	407	201	0	100	20	15	100	30
102	106	201	0	0	50	10	40	30
103	408	201	0	150	20	10	150	70
104	106	201	0	0	30	25	7000	20
105	106	201	0	0	200	20	500	30
106	106	201	10000	300	30	2000	500	100
107	102	201	10000	100	50	20	1000	50
108	106	201	0	0	35	25	200	25
109	406	201	0		40	200	100	30
110	406	201	0	0	40	150	50	70
111	309	201	0	0	300	10	20	20
112	109	201	700	300	150	2000	100	2500
113	109	201	200	0	400	15	200	30
114	109	201	0	0	400	200	70	10
115	106	201	30	100	500	100	20	250
116	410	201	0	0	10000	70	15	30
117	106	201	0	0	200	10	20	400
118	106	201	0	0	10000	70	20	40
119	102	201	0	0	200	15	15	20
120	106	201	0	0	300	15	30	130
121	106	201	50	20	300	15	20	30
122	106	201	50	0	300	15	30	40
123	106	201	100	40	200	10	35	30
124	106	201	0	30	200	10	25	30
125	106	201	0	40	400	150	30	30
126	102	201	0	0	700	10	25	30
127	106	201	0	20	500	15	20	40
128	106	201	30	50	300	15	30	20
129	106	201	130	0	600	10	40	40
130	102	201	140	0	400	10	20	40
131	106	201	40	20	500	10	10	10
132	106	201	40	10	500	70	20	15
133	102	201	30	20	250	5000	30	10000
134	106	201	50	0	150	25	50	30
135	106	201	100	0	2623	15	25	20
136	102	201	10000	10000	2624	25	30	400
137	106	201	0	0	15	10	200	50
138	106	201	0	20	2626	10	30	20
139	106	201	0	0	2627	10	30	30
140	102	201	300	2000	2628	40	30	40
141	106	201	100	50	50	200	30	60
142	106	201	700	0	500	2000	100	2500

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
143	106	201	700	20	20	15	35	20
144	102	201	10000	5000	1500	1000	30	2000
145	106	201	30	5000	100	20	50	30
146	106	201	0	0	40	20	30	10
147	102	201	150	10000	100	35	30	10
148	106	201	100	0	15	25	1500	10
149	106	200	500	0	500	75	30	30
150	102	200	200	10000	7000	3000	50	3000
151	106	200	10000	0	10000	10000	9000	30
152	106	200	10000	5000	10000	1000	100	70
153	106	200	500	30	800	80	150	2000
154	102	200	0	20	100	20	30	100
155	106	200	0	100	150	150	30	10000
156	106	200	0	0	500	100	100	150
157	106	200	100	500	10000	10000	7000	6000
158	102	200	200	500	700	4000	10000	1000
159	106	200	200	2000	10000	5000	1000	4000
160	106	200	80	0	150	10	100	70
161	102	200	70	700	80	150	150	2500
162	106	200	30	0	30	150	200	20
163	106	200	10000		400		100	100
164	106	200	10000	10000	10000	7000	50	10000
165	311	200	2000	10000	10000	10000	10000	10000
166	106	200	10000	2000	3500	1000	2000	700
167	106	200	3000	10000	1500	200	100	1100
168	105	201	100	300	1500	10000	4000	2000
169	102	201	100	300	10000	40	1200	1000
170	105	201	1000	700	9000	4000	4000	2000
171	106	201	40			10	70	10
172	406	201				10		10
173	106	201				100	20	500
174	106	201				10	20	100
175	106	201				10	20	10
176	406	201						
177	408	201						
178	906	201					500	
179	906	201					50	10
180	105	200	10000	300	4000	3000	9000	3000
181	105	200	30	50	300	60	100	80
182	105	200	10000	7000	10000	10000	5000	10000
183	105	200	30	20	500	10	50	25
184	105	200	100	300	1000	300	2000	60
185	105	200	0	0	300	25	150	50
186	102	200	10000	200	400	2000	20	1000
187	105	200	0	0	400	20	20	40
188	105	200	0	20	80	150	20	50
189	102	200	0	20	30	10	15	30
190	105	200	0	40	70	20	10	30

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
191	106	200	70		1000	700	1500	2000
192	507	201	0	0	30	10	30	50
193	507	201	0	0	50	10	20	40
194	507	201	0	300	30	20	20	10
195	508	201	0	0	30	10	30	200
196	508	201	0	500	2000	30	40	70
197	508	201	0	0	20	10	30	50
198	507	201	30	0	10	10	50	30
199	507	201	50	300	15	50	50	40
200	507	201	20	0	20	30	40	20
201	508	201	0	200	700	10	40	200
202	508	201	0	300	1000	10	40	700
203	508	201	10000	0	100	20	50	200
204	107	201	2000	2000	2500	600	50	700
205	102	201	10000	1500	2500	150	80	150
206	107	201	0	275	400	50	150	80
207	108	201	0	1500	200	40	700	70
208	102	201	300	200	20	10	500	10000
209	108	201	10000	2500	10000	2000	500	200
210	106	201	300	1500	1500	1000	40	300
211	106	201	500	10000	1000		300	
212	106	201	200	200	150		9000	200
213	106	201	10000	10000	10000	10000	300	10000
214	105	201	300	10000	9000		30	10
215	102	201	500	300	1000		3000	5000
216	107	201	100	1000	15	300	50	
217	102	201	50	10000	30	10	200	
218	107	201	70	2000	6000	700	9000	
219	108	201	30	1000	150	20	200	
220	102	201	2000	10000	200	10	200	
221	108	201	150	2000	2500	300	3000	1000
222	102	201	400	50	100	10	500	500
223	102	201	700	2000	30	150	700	900
224	106	201	700	70	10000	10000	70	1000
225	102	201	0	50	30	80	30	30
226	106	201	0	0	15	40	30	30
227	106	201	10000	3000	2000	2000	1000	10000
228	106	201	300	30	4500	400	50	300
229	102	201	10000	10000	1000	150	100	100
230	106	201	500	40	200	150	50	150
231	106	201	30	150	500	20	30	90
232	106	201	300	150	150	400	100	400
233	102	201	400	10000	40	60	70	30
234	106	201	200	20	40	10	50	20
235	106	201	0	30	20	20	50	15
236	102	201	10000	700	30	200	40	300
237	106	201	300	10000	3000	1500	200	2000

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
238	106	201	0	20	30	50	30	15
239	106	201	300	<500	1500	3000	400	300
240	106	201	1000	2000	200	1200	50	2000
241	309	201	500	30	10000	100	50	20
242	109	201	2000	10000	25	10	200	30
243	109	201	10000	700	50	1000	50	300
244	109	201	700	4000	2000	20	200	50
245	106	201	10000	5000	10000	2000	30	7000
246	102	200	10000	4000	100	10	1500	10000
247	106	200	0	2000	200	10	10	2000
248	507	200	0	4000	10000	60	30	300
249	102	200	0	7000	10000	10000	10000	10000
250	102	200	0	<000	1000		10000	300
251	106	200	150	7000	0		2000	4000
252	508	200	100	<300	0	400	10	100
253	106	200	10000	60	0	10	5	400
254	108	200	10000	50	0	10	5	30
255	102	200	0	60	10	10	10	10000
256	108	200	0	40	10	10	5	150
257	102	200	10000	150	20	10	100	100
258	107	200	50	10000	5000	10	2000	300
259	507	200	70	10000	3000	10	10	50
260	106	200	10000	1800	1000	600	500	200
261	106	200	0	150	10000	1000	10000	10000
262	106	200	0	100	200	30	10	40
263	508	200	0	70	10	10	10	40
264	106	200	150	500	300	10	10	10000
265	108	200	0	150	10	15	5	70
266	102	200	200	500	40	100	20	200
267	108	200	0	500	20	50	150	500
268	106	200	10000	3000	500	500	200	1500
269	106	200	10000	10000	300	10	10	100
270	106	200	200	700	1500	10	5	200
271	102	200	0	150	10	10	5	80
272	106	200	400	250	70	10	20	60
273	101	200	1000	10000	10000	10000	10000	10000
274	102	200	10000	10000	150	1500	250	10000
275	101	200	150	9000	70	20	9000	300
276	102	200	10000	3000	10000	150	500	900
277	102	200	200	1000	80	1500	2000	1500
278	102	200	0	300	80	30	10	100
279	601	200	2000	1500	10000	10000	10000	50
280	612	200	100	300	30	10	10	100
281	102	200	500	600	50	400	280	800
282	605	200	200	300	100	100	40	200
283	605	200	300	1000	700	1000	1000	4000
284	105	200	200	300	100	30	100	70
285	105	200	200	100	50	50	70	70

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
286	102	200	1000	9000	10000	700	1000	700
287	105	200	50	300	100	30	40	150
288	101	200	300	1200	100	10000	200	10000
289	102	200	100	200	50	1000	100	400
290	102	200	150	200	0	10	10	50
291	102	200	10000	1100	300	1000	1000	700
292	102	200	2000	9000	10	10000	10	100
293	102	200	70	100	15	10	30	30
294	601	200	10000	10000	10	10000	10000	50
295	612	200	150	1000	20	10	100	50
296	102	200	150	200	100	1000	600	30
297	605	200	100	200	20	60	30	30
298	106	200	500	150	30	800	200	1000
299	105	200	0	50	15	10	80	150
300	105	200	30	40	15	10	50	20
301	102	200	500	10000	50	6000	2000	10000
302	105	200	100	150	50	40	60	50
303	106	201	500	20	5000		200	100
304	102	201	100	300	20	15	55	150
305	106	201	200	500	400	1000	50	10000
306	106	201	0	100	30	10	40	100
307	106	200	10	2000	10000	300	10000	10000
308	102	200	500	7000	10000	2500	3000	10000
309	106	200	10	1500	10000	80	500	1500
310	102	200	500	3000	10000	250	100	3000
311	106	200	20	80	20	10	10	50
312	102	200	30	10000	10000	10	20	40
313	106	200	10	150	30	50	10	50
314	102	200	100	6000	10000	700	10000	5000
315	106	200	20	400	15	350	200	40
316	102	200	20	300	50	350	200	200
317	106	200	10	9000	40	60	300	1500
318	106	200	500	4000	7000	500	2000	40
319	102	200	300	150	7000	1000	30	700
320	106	200	600	100	30	100	100	30
321	310	200	10	200	20	150	50	40
322	102	200	50	1500	100	10000	10000	80
323	310	200	20	100	15	10	100	20
324	102	200	70	400	20	24	300	400
325	106	200	15	50	15	30	70	50
326	106	200	500	10000	60	10000	5000	2000
327	102	200	20	700	300	80	35	300
328	102	200	10	7000	400	60	100	150
329	102	200	20	2000	15	150	200	30
330	102	200	10	10000	70	30	50	20
331	106	200	20	9000	10000	2000	90	50
332	102	200	10	300	1500	300	500	50
333	102	200	15	250	50	10	40	20

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
334	102	200	30	6000	4000	500	100	700
335	106	200	40	150	20	10	100	30
336	102	200	200	10000	1500	30	90	200
337	106	200	40	5000	10000	1000	70	400
338	507	200	50	200	10	100	20	
339	106	200	30	40	15	70	40	
340	102	200	70	3000		1000	30	
341	102	200	500	10000		100	6000	
342	311	200	300	0	150	100	40	
343	106	200	30	150	300	200	50	
344	106	200	200	10000	30	20	60	
345	102	200	20	0	2562	40	30	
346	106	200	200	30	6000	1500	30	
347	102	200	200	10000	6000	5000	100	
348	106	200	200	10000	200	2000	20	
349	102	200	200	10000	80	100	20	
350	106	200	30	300	1500	30	20	
351	106	100	50	150	10	10	50	70
352	102	100	10000	10000	2000	500	10000	10000
353	106	100	100	30	15	20	10	70
354	102	100	100	1500	2000	900	10000	10000
355	102	100	50	0	1000	6000	10000	10000
356	102	100	50	350	400	50	70	150
357	106	100	20	75	100	20	20	70
358	102	100	70	10000	10000	1500	2500	10000
359	106	100	100	0	30	30	10	100
360	102	100	70	150	20	10	30	30
361	106	100	50	250	700	400	300	10000
362	106	100	150	5000	300		1500	3000
363	507	200	30	10000	30	10000	10000	10000
364	102	200	100	1500	1500	3000	4000	10000
365	102	200	0	10000	10000	10000	10000	10000
366	102	200	0	800	100	40	100	3000
367	508	200	700	10000	2000	10000	10000	10000
368	311	200	50	150	15	20	50	60
369	102	200	1000	10000	200	200	200	300
370	102	200	1000	10000	20	30	150	50
371	106	200	1000	7000	30	500	6000	10000
372	102	200	150	10000	100	200	5000	300
373	106	200	100	10000	1000	2000	1000	10000
374	102	200	10000	5500	500	5000	8000	9000
375	106	200	300	4000	30	8000	10000	3000
376	102	200	20	150	30	10	20	50
377	106	201	70	150	50	150	5	200
378	102	201	65	10000	60	10	10	60
379	106	201	70	200	30	10	40	500
380	102	201	40	1000	1500	400	100	5000
381	106	201	50	40	60	150	500	500

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
382	106	201	30	0	20	10	30	15
383	102	201	1000	10000	9000	2000	10000	10000
384	106	201	20	200	30	10	10	20
385	506	201	10	0	10	100	20	100
386	102	201	10000	10000	10000	10000	10000	10000
387	106	201	10	10000	200	100	200	1000
388	106	201	20	500	400	200	10	1000
389	102	201	30	4000	50	5000	2000	1000
390	106	201	70	30	100	10	10	50
391	601	201	50	250	50	10	10	30
392	102	200	20	350	300	200	300	400
393	102	200	30	200	100	30	20	25
394	106	200	70	5000	10000	1500	1500	20
395	106	200	50	150	40	150	10	50
396	106	200	10	250	10	150	250	500
397	106	200	30	6000	10000	40	3000	4000
398	102	200	100	300	10	0	200	2000
399	106	200	20	1500	40	100	60	30
400	102	200	10000	0	15		50	1000
401	605	200	100	200	20	1000	500	300
402	106	201	300	10000	30	10000	5000	8000
403	102	201	30	200	20	70	150	100
404	106	201	35	300	50	40	10	50
405	102	201	30	700	2000	2000	800	2500
406	106	201	30	800	60	30	10	70
407	102	200	500	200	60	50	10	70
408	605	200	200	10000	90	60	10	200
409	102	200	2000	10000	1500	2000	800	10000
410	102	200	70	200	10	3000	150	2000
411	106	200	100	150	10	50	30	30
412	106	200	70	400	15	1500	400	250
413	106	200	200	10000	300	10000	10000	500
414	102	200	1000	10000	300	50	2500	10000
415	106	200	200	20	400	10000	10000	700
416	106	200	20	70	90	20	5	10
417	102	200	50	50	1500	10	2000	150
418	106	200	2000	4000	700	10000	200	300
419	102	200	1000	200	200	40	250	50
420	106	200	30	1500	350	40	200	1000
421	102	201	10	70	10	40	30	50
422	106	201	30	70	40	150	10	20
423	102	201	1500		10000	500	500	150
424	106	201	50	300	150	50	300	40
425	102	201	30	10000	3000	10000	2000	150
426	106	201	35	10000	7000	10000	300	10
427	102	201	20		10000	10000	2000	80
428	102	201	7000	10000	100	6000	6000	100
429	106	201	20	1000	20	200	200	40

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
430	507	201	2000		10000	10000	10000	10000
431	508	201	55	200	200	1500	1000	150
432	106	201	10000	500	1000	10000	700	20
433	106	201	100	20	200	100	100	20
434	102	201	300	2000	1000	4000	700	1000
435	106	201	50	30	50	30	50	475
436	106	200	20	700	30	7000	50	40
437	102	200	50	10000	70	50	30	100
438	106	200	30	0	20	70	100	1500
439	102	200	1500	200	30	150	100	150
440	106	200	150	0	10	15	20	60
441	102	200	100	0	40	1000	100	90
442	106	200	500	10000	2500	10000	9000	50
443	106	200	10000	60	40	10000	300	60
444	106	200	100	40	2000	10	20	150
445	106	200	1000	10000	20	10000	10000	150
446	106	200	50	10000	1000	150	10000	10000
447	102	200	2000	1500	300	10000	1000	40
448	106	200	10000	500	80	10	500	70
449	106	200	10	10000	10	10	10	40
450	106	200	1000	10000	15	350	10	80
451	106	200	30	200	5	500	30	50
452	106	200	25	40	7	10	100	40
453	106	200	20	200	10	10	20	10000
454	407	200	50	200	5	1000	10	40
455	313	200	50	10000	10	10000	30	30
456	106	200	10	150	5	3000	50	30
457	102	200	10000	10000	10	10000	10000	50
458	407	200	30	6000	5	10000	2000	30
459	106	200	20	0	5000	700	10	20
460	106	200	10000	100	30	10000	300	80
461	106	200	700	10000	10	1000	2000	150
462	106	200	30	1000	10	150	300	150
463	106	200	60	700	20	10	50	150
464	102	200	10000	10000	2000	10000	8000	10000
465	106	200	50	200	70	1500	10	50
466	106	200	10000	100	60	700	10	10000
467	106	200	35	100	10	150		80
468	102	200	10	30	20	50	30	40
469	106	200	20	300	100	70	50	30
470	106	200	2000	6000	10	4000	200	250
471	106	200	20	300	40	150	20	40
472	106	200	50	200	10000	60	100	30
473	106	200	200	5000	10	10000	10000	500
474	106	200	3000	300	20	30	10	50
475	106	200	7000	50	5	60	1000	70
476	106	200	20	6000	300	10000	100	70
477	106	200	1000	50	10	70	20	40

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
478	106	200	100	10000	200		20	70
479	106	200	3000	10000	300		200	2000
480	106	200	20	700	150		10	400
481	106	200	10000	5000	10000		10000	800
482	106	200	10000	10000	200	9000	10	70
483	106	200	300	300	250	30	700	30
484	102	200	300	700	6000	100	300	30
485	106	200	300	0	10	1000	20	70
486	102	200	2000	50	200	40	10	40
487	106	200	150	70	50	60	10	30
488	102	200	1000	5000	1500	10000	20	1000
489	106	200	20	3000	4000	1500	20	200
490	106	200	10000	1000	2000	400		100
491	106	200	50	50	10000			250
492	106	200	7000	7000	500	10000	70	1000
493	106	200		10000	10000	30	10000	10000
494	106	200	10000	5000	6000	10000	2000	3000
495	106	200	2000	10000	100	10000	100	10000
496	106	200	1000	100	10	40	10	10000
497	106	200	500	5000	200	10000	2000	300
498	106	200	250	9000	10000	2500	10	3000
499	106	200	100	10000	70	10	10	600
500	106	200	10	500	40	70	10	500
501	407	200	10000	10000	1000	500	20	1000
502	313	200	200	2000	300	1500	10	400
503	106	200	100	50	15	1500	10	800
504	102	200	30	200	5	200	50	80
505	407	200	10000	200	1000	70	50	9000
506	106	200	10000	10000	10000	10000	30	10000
507	106	200	200	10000	10000	10000	10	6000
508	106	200	100	800	1000	1000	10	700
509	106	200	3000	100	10000	10000	20	1000
510	102	200	100	100	30	100	10	500
511	106	200	100	100	50	400	15	700
512	106	200	70	10000	500	300	11	800
513	106	200	50	2000	50	10	10	800
514	102	200	1000	10000	400	10000	30	10000
515	106	200	10	200	2000	10	100	700
516	106	200	500	7000	10000	10000	10	1500
517	106	200	10	3000	50	40	10	250
518	106	200	10	1500	700	30	200	80
519	106	200	10000	10000	10000	10000	10	150
520	106	200	150	200	15	80	10	900
521	106	200	5000	700	1000	30	20	40
522	106	200	70	100	60	70	10	50
523	106	200	10	30	20	10	20	30
524	106	200	5000	10000	10	10000	10	50
525	106	200	10000	200	10	70	150	300

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
526	106	200	300	9000	20	10	10000	10000
527	106	200	30	100	10	100	100	100
528	106	200	300	10000	10	10000	700	40
529	106	200	4000	10000	10	700	10000	4000
530	106	200	20	70	50	50	200	50
531	106	200	30	250	10	200	300	100
532	106	200	10000	10000	50	10000	10000	200
533	106	200	70	70	10	150	300	50
534	106	200	100	700	10	20	700	40
535	106	200	900	1500	20	700	1500	80
536	106	200	50	400	30	200	300	40
537	106	200	400	5000	30	5000	1000	2000
538	106	200	100	2000	10	10000	10	40
539	106	200	400	900	10	2000	3000	30
540	106	200	30	30	10	100	100	90
541	106	200	10000	2000	200	10000	40	60
542	106	200	10000	10000	9000	10000	1500	2000
543	106	200	1100	400	20	100	3000	800
544	106	200	20	20	10	100	70	100
545	106	200	300	5000	10	10000	1500	400
546	106	200	1000	5000	30	10000	300	200
547	106	200	60	0	200	20	10	150
548	106	200	90	0	100	500	20	500
549	102	200	90	30	100	60	30	150
550	106	200	150	0	50	20	15	900
551	106	200	700	100	30	10000	300	300
552	106	200	100	0	20	30	10	150
553	106	200	1000	500	20	700	600	70
554	106	200	10000	30	100	40	150	10
555	106	200	600	5000	60	30	7000	2000
556	106	200	100	100	1000	700	400	100
557	102	200	100	150	200	4000	10	1500
558	106	200	30	30	50	200	40	800
559	106	200	350	3000	10000	500	150	200
560	106	200	10	0	10	10	10	60
561	102	200	10	0	10	1500	10	10
562	106	200	10	0	10	10	70	10
563	106	200	10	0	10	50	10	10
564	102	200	10		25	20	10	10
565	106	200	80	500	10000	4000	10	10000
566	102	200	100	0	2000	1000	20	10000
567	106	200	20	200	550	100	700	700
568	106	200	10	0	10	10	10	10
569	102	200	10	30	25	70	10	60
570	106	200	10	50	10	30	10	10
571	106	200	90	100	1000	50		40
572	102	200	400	10000	10000	8000		10000
573	106	200	15	0	70	10		30

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
574	106	200	300	10000	500	10000		10
575	106	200	10000	>000	5000	10000		1500
576	106	100	10000	10000	10000	10000	10000	10000
577	106	100	30	0	50	70	30	20
578	102	100	60		200	400	20	10
579	106	100	30	50	50	10	20	80
580	106	100	10000	200	40	50	30	70
581	106	100	40	200	40	30	40	50
582	102	100	20	50	50	60	30	40
583	106	100	50	300	40	30	20	15
584	106	100	10000	<000	50	3000	300	50
585	106	100	60	50	70	25	20	30
586	102	100	300	10000	2000	10000	200	60
587	106	100	50	70	100	40	20	50
588	106	100	10000	10000	30	6000	300	20
589	106	100	10		1000	50	100	30
590	102	100	7000		10000	300	4000	200
591	106	100	400		200	40	20	90
592	106	100	40	90	5		300	30
593	102	100	30	900	5	50	300	30
594	106	100	20	1500	5	100	200	15
595	106	100	10	400	5	1500	300	30
596	106	100	25	200	10	30	100	250
597	102	100	20	250	5	50	200	100
598	106	100	30	200	5	100	200	90
599	106	100	10000	100	5	50	5000	25
600	106	100	40	500	100	100	1000	30
601	106	100	30	200	30	70	2000	30
602	106	100	10000	200	25	70	2000	25
603	106	100	900	900	5	70	2000	25
604	106	100	300	80	5	100	100	250
605	106	100	30	40	5	30	1000	100
606	106	100	20	0	5	10	1000	150
607	407	100	2000	40	5	30	20	5000
608	106	100	60	300	10	70	1000	30
609	106	100	10000	400	7	40	7000	25
610	106	100	300	250	10	50	2000	50
611	106	100	1500	10000	10000	3000	3000	400
612	106	100	200	1000	50	50	1000	1000
613	106	100	500	900	50	50	10000	6000
614	106	100	1500	10000	10000	5000	100	15
615	106	100	900	10000	100	400	10000	500
616	106	100	1500	400	50	70	5000	10000
617	106	100	150	0	150	150	100	20
618	102	100	10000	10000	10000	10000	1000	10000
619	106	100	300	2500	100	200	50	700
620	106	100	20	10000	10000	10000	2000	20
621	106	100	400	300	300	150	100	1500

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
622	106	100	150	400	200	150	100	9000
623	106	100	150	3500	200	50	200	70
624	106	100	80	10000	150	10000	1000	25
625	106	100	200	400	30	20	100	15
626	106	100	30	9000	800	10	1000	150
627	106	100	100	10000	10000	10000	2000	150
628	407	100	25	10000	80	10000	200	150
629	106	100	275	10000	10000	10000	10000	30
630	106	100	150	10000	500	1000	1000	30
631	106	100	40	700	600	4000	4000	40
632	106	100	40	50	500	350	100	50
633	106	100	90	1000	200	200	300	70
634	106	100	50	500	70	300	200	40
635	106	100	3000	10000	700	10000	10000	15
636	106	100	50	4000	3000	10000	1000	150
637	106	100	80	10000	150	10000	2000	30
638	106	100	100	100	60	400	100	100
639	102	100	300	1500	200	2000	5000	40
640	106	100	200	10000	10000	10000	300	25
641	106	100	10000	10000	10000	10000	3000	40
642	106	100	150	2500	2000	1000	700	300
643	102	100	10000	10000	2000	10000	10000	10000
644	106	100	1500	10000	500	10000	700	400
645	707	100	275	200	70	800	100	40
646	106	100	10000	10000	1500	10000	100	400
647	106	100	300	200	30	10	10	30
648	106	100	250	200	20	10	10	150
649	106	100	1000	5000	1000	10000	1000	500
650	106	100	10000	10000	1000	3000	200	300
651	708	100	60	150	100	150	100	25
652	106	100	800	50	50	30	10	30
653	102	100	10000	10000	10000	10000	4000	100
654	106	100	150	500	100	400	20	80
655	106	100	10000	10000	3000	300	1000	50
656	106	100	7000	300	1500	700	250	10000
657	102	100	10000	10000	9000	5000	500	10000
658	106	100	9000	400	5000	10000	10000	10000
659	106	100	70	30	30	250	350	70
660	102	100	10000	10000	150	10000	2000	400
661	106	100	15	150	100	50	15	10
662	102	100	7	100	10	100	150	50
663	106	100	10	700	300	150	400	50
664	106	100	70	2500	100	1000	250	10
665	102	100	10	10	10	15	20	10
666	106	100	10	5	10	10	10	10
667	102	100	10000	10000	5000	10000	10000	10000
668	106	100	200	200	5000	2000	3000	10
669	106	100	10	10	10	10	10	10

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
670	102	100	10	100	200	200	150	10
671	106	100	50	500	200	4000	2000	1500
672	102	100	10000	500	10	10000	10000	10000
673	106	100	300	5000	2000	10000	10000	10000
674	102	300	10000	1500	100	600	70	200
675	102	300	500	150	70	20	10	10
676	102	300	1100	5000	10000	70	1500	250
677	106	300	175	150	20	10	10	10
678	102	300	100	70	40	10	10	10
679	106	300	150	100	10	10	10	10
680	102	300	300	150	0	15	50	20
681	106	300	90	20	10	10	10	10
682	106	300	10	100	40	10	20	10
683	106	300	50	15	10	10	10	10
684	102	300	20	10	10	10	10	10
685	106	300	50	15	10	10	10	10
686	106	300	10	10	10	10	50	10
687	102	300	40	3500	200	400	1500	10
688	106	300		20	20	30	10	90
689	102	300		5000	10	1500	10000	700
690	106	300	10	10	10	10	10	70
691	102	300	700	700	10	1000	2000	100
692	106	300	70	15	20	20	10	90
693	106	300	70	10	10	50	10	80
694	102	300	10	15	10	50	200	80
695	106	300	70	10	50	10	10	60
696	102	300	150	1500	100	2500	3000	80
697	106	300	10	10	100		200	80
698	106	200	250	250	10	40	100	80
699	102	200	10000	10000	70	10000	10000	100
700	106	200	10000	15	10	70	600	300
701	410	200	0	30	10	50	100	70
702	406	200	40	50	400	200	150	400
703	106	200	0	10000	10	15	30	50
704	106	200	0	30	40	25	10	80
705	106	200	0	8	10000	10		300
706	106	200	0	8	1500			
707	106	200	500	5000	9000	10000	800	200
708	106	200	0	200	40	20	10	30
709	106	200	10000	10000	10000	10000	10000	1500
710	408	200	0	25	10	10	10	30
711	106	200	0	50	10	10	10	25
712	408	200	0	10	10	10	10	20
713	106	200	0	8	35	15	20	25
714	106	200	30	25	10	10	10	40
715	407	200	0	10	10	10	10	40
716	106	200	0	7	10	10	10	10
717	106	200	0	10	10	10	0	50

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
718	106	200	0	20	10	15	10	10
719	106	200	0	10	10	10	10	20
720	407	200	0	50	10	10	10	20
721	106	200	3000	350	150	10	30	40
722	106	200	0	200	20	10	10	20
723	106	200	0	3000	5000	10000	150	10
724	408	200	0	150	30	2000	1500	60
725	106	200	0	50	15	700	700	50
726	408	200	70	150	10	400	150	50
727	106	200	0	15	10	50	10	50
728	408	200	0	15	10	40	10	40
729	408	200	50	10	20	30	10	70
730	106	200	50	30	20	70	10	80
731	408	200	30	200	30	250	50	60
732	106	200	80	200	300		15	40
733	408	200	200	1500	1000		700	40
734	102	200	30	2000	4000		2500	3000
735	102	200	30	150	300	150	150	200
736	102	200	70	30	10	20	5	1000
737	102	200	10000	700	10	20	5	500
738	102	200	10000	15	10	10000	10000	400
739	102	200	1000	10000	1000	10000	3000	300
740	102	200	10000	400	400	400	1000	40
741	102	200	300	10000	1500	7000	400	200
742	102	200	500	4000	100	6000	500	1500
743	102	200	100	300	1500	2000	1500	200
744	102	200	2000	10000	10000	10000	10000	10000
745	102	200	2000	1100	1000	10000	10000	600
746	102	200	10000	10000	3000	10000	3000	400
747	102	200	0	70	10	20	10	30
748	102	200	100	500	15	1500	300	25
749	106	200	0	15	10	10	3000	50
750	106	200	0	15	20	10	3000	
751	102	200	0	15	10	10	10	
752	106	200	50	10	10	15	150	10
753	106	200	0	10	30	300	10	
754	102	200	0	10	10	10	20	
755	106	200	10000	7000	200	25	40	
756	106	200	0	15	10	10	30	
757	102	200	0	15	10	10	10	20
758	106	200	70	150	30	10000	1500	700
759	106	200	0	10	20	150	50	
760	102	200	0	10	20	50	10	
761	106	200	3000	10	30	4000	10000	10000
762	106	200	0	10	10	30		10
763	102	200	0	10	10	150	150	20
764	106	200	0					

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
765	106	200	0	20	10		10	10
766	106	200	0					
767	106	200	0					
768	106	200	0	10	10		10	10
769	106	200	0	10	10		100	10
770	410	200	300					
771	410	200	300					
772	406	200	0	10	10			
773	408	150	100	5000	3000	40	9000	80
774	102	150	10000	8000	70	10000	10000	200
775	106	150	700	300	4	30	100	100
776	102	150	10000	4000	2000	1500	500	200
777	406	150	0	15	10	4	10	20
778	102	150	10000	8000	5000	1000	10	800
779	102	150	300	10000	10	40	20	
780	102	150	10000	10000	3000	10000	10000	
781	106	150	1000	10000	4000	2000	20	20
782	106	150	10000	10000	200	100	20	300
783	106	150	0	25	5	20	10	100
784	102	150	0	40	5	5	20	20
785	106	150			5	30	10	15
786	102	150	0	30	10	7	10	20
787	106	150	0	60	5	10	20	50
788	102	150	400	9000	300	4000	300	40
789	106	151	400	10000	40	300	300	100
790	102	151	500	4500	5000	3000	1000	200
791	106	151	100	1000	10000	3000	20	700
792	102	151	30	100	20	100	20	80
793	106	151	20	10000	7000	5000	400	200
794	102	150	10000	5000	100	5000	10000	60
795	106	150	200	500	40	2000	30	200
796	102	150	10000	6000	1500	5000	1100	1500
797	106	150	10000	1000	400	300	200	150
798	106	150	200	40	40	40	10	
799	102	150	100	30	50	30	20	50
800	106	150	300	60	20	40	10	50
801	303	150	400	300	10	30	50	1500
802	106	150	10000	100	100	10	20	1000
803	807	150	10000	0	1000	300	20	300
804	808	150	10000	10000	7000	3000	10	2000
805	809	150	400	10000	10000	100	20	150
806	304	150	10000	100	20	30	10	150
807	106	150	0	30	30	40	10	100
808	102	150	10000	10000	3000	3000	100	200
809	106	150	1000	30	50	20	30	300
810	102	150	10000	10000	700	50	30	20
811	106	150	3000	20	20	30	10	150
812	102	150	10000	50	20	100	50	150

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
813	106	150	700	1000	50	500	1000	70
814	1C6	15C	400	0	30	10	10	50
815	102	150	400	0	40	100	10	50
816	1C6	15C	100	0	40	100	20	150
817	303	150	0	0	20	70	20	30
818	1C6	15C	C	0	100	10000	100	40
819	807	150	200	0	50	10000	200	25
820	8C8	150	30	0	50	500	300	50
821	106	150	40	0	70	7000	20	30
822	3C4	15C	3C	30	100	100	10	30
823	106	150	0	0	10	250	100	30
824	1C2	150	0	150	10	10000	10000	25
825	106	150	20	100	20	30	10	30
826	1C2	15C	C	70	10	1500	15	30
827	106	150	20	150	5	200	50	20
828	102	150	20	150	5	2000	10000	50
829	106	150	100	100	20	200	200	500
83C	1C6	15C	3000	300	1500	10	1000	70
831	102	150	150	0	15	50	30	100
832	106	150	0	0	50	4	15	40
833	106	150	0	70	50	3	20	20
834	1C6	15C	1CCCC	150	500	7	20	40
835	507	150	400	0	10	20	15	30
836	5C8	150	50	20	30	3	20	40
837	315	150	20	70	15	7	10	30
838	1C2	15C	1CCCC	150	500	4000	1000	30
839	106	150	10000	150	2000	20	50	20
840	106	150	15C	50	100	100	1000	40
841	406	150	0	0	15	20	30	200
842	1C6	15C	3C	50	10	10	500	500
843	106	150	10000	600	750	300	100	2000
844	106	150	10000	6000	200	300	100	700
845	106	150	150	50	150	30	2000	6000
846	1C6	15C	10000	75	30	50	50	100
847	106	150	10000	5000	10000	10000	3000	6000
848	106	150	10000	700	30	1300	10000	10000
849	106	150	150	20	15	40	100	500
85C	1C2	15C	200	0	40	40	300	100
851	106	150	200	0	40	50	200	200
852	106	150	200	150	200	30	10000	10000
853	106	150	10000	10000	150	700	70	10000
854	1C2	15C	1CCCC	0	2000	50	2000	300
855	106	150	100	0	20	10	1000	300
856	102	200	10000	40	20	5	1500	800
857	106	200	1000	0	15	4	100	300
858	102	200	10000	0	200	4	200	1000
859	102	200	10000	10000	10000	10000	10000	10000
86C	1C6	20C	1CCC	0	20	5	20	50

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
861	106	200	10000	10000	700	220	2000	2000
862	106	200	10000	6000	10000	10000	10000	1500
863	106	200	800	0	20	7	30	400
864	106	200	10000	0	500	45	200	1000
865	102	200	1000	500	10000	6	100	200
866	106	201	1000	60	50	15	300	30
867	102	201	1000	70	50	30	500	30
868	102	201	200	80	80	40	300	200
869	102	201	200	100	90	20	100	40
870	102	201	500	700	40	70	50	50
871	106	150	500	1000	15	30	20	50
872	102	150	500	5000	15	4	10	200
873	106	150	70	700	20	3	10	200
874	102	150	0	80	15	3	10	100
875	106	150	40	600	15	5	20	400
876	102	150	10000	700	40	3	70	30
877	106	150	0	1000	30	5	40	30
878	102	150	0	7000	30	4	20	30
879	106	150	250	600	20	6	20	400
880	102	150	150	500	30	3	10	50
881	106	150	30	100	30	2	20	40
882	106	150	2000	700	10	7	10	50
883	102	150	2000	1000	4000	10000	15	10
884	106	150	70	4000	50	20	10	0
885	106	150	300	700	10000	50	50	2000
886	102	150	10000	1000	10000	10000	10000	10000
887	102	150	10000	800	200	700	7000	9500
888	106	150	300	4000	100	10	3000	400
889	102	150	100	9000	10000	40	1500	50
890	106	100	50	1000	150	100	100	100
891	102	100	10000	800	75	20	50	150
892	102	100	10000	2000	10000	3000	3000	1500
893	106	100	0	500	500	150	500	300
894	106	100	10000	7000	4000	700	4000	5000
895	102	100	500	1000	700	10	3000	3000
896	106	100	10000	2000	70	10	100	1000
897	106	150	10000	10000	500	7000	200	4000
898	102	150	1000	10000	2000	1000	100	100
899	106	150	300	10000	100	10000	1000	20
900	102	150	10000	4000	4	300	20	20
901	106	150	150	200	20	20	20	60
902	102	150	10000	4000	300	300	100	20
903	102	150	10000	5000	2000	10000	30	60
904	106	150	100	100	10	35	10	50
905	507	150	900	50	6	20	20	60
906	102	150	10000	10000	3000	10000	1000	30
907	106	150	200	50	7	1500	20	3000
908	106	150	200	300	15	400	20	100

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
909	508	150	200	30	1500	50	30	25
910	106	150	0	30	100	900	100	30
911	102	150	70	50	10	250	200	150
912	106	150	200	700	10	800	20	50
913	106	200						
914	106	200						
915	106	200						
916	102	200						
917	106	200						
918	406	200						
919	106	200						
920	106	200						
921	106	200						
922	106	200						
923	106	200						
924	106	200						
925	102	200						
926	106	200						
927	106	200						
928	106	200						
929	106	200						
930	106	200						
931	106	200						
932	106	200						
933	106	200						
934	102	200						
935	106	200						
936	106	200						
937	106	200						
938	106	200						
939	106	200						
940	106	200	10000	7000	150			
941	106	200	10000	20	10000			
942	106	300			10	10	10	10
943	102	300			20	20	10	10
944	106	300			15	25	10	10
945	106	300			10	15	10	10
946	102	300		15	10	20	10	10
947	102	300		10000	20	10000	40	70
948	106	300		20	15	10	10	10
949	102	300		40	10	10	10	10
950	106	300		50	10	10	10	10
951	106	300		30	10000	10	10	10
952	102	300		25	10	10	10	10
953	106	300		20	10	10	10	10
954	102	400		10	20	10	10	100
955	102	400		40	10	10	15	10

Point	Source	Service	OVA readings					
			1	2	3	4	5	6
956	102	400		500	10	10	100	10000
957	102	400		35	10	10	25	10
958	102	400		500	10	100	10	10
959	102	400		300	20	10	50	10
960	106	300		10	10	10	10	60
961	102	300		15	10	10	10	40
962	106	300		40	30	10	10	40
963	106	300		15	30	10	10	30
964	102	300		10	10	20	20	25
965	106	300		10	20	10	10	30
966	102	300		1200	15	25	30	100
967	106	301		30			10	60
968	106	201				250		500
969	102	201				10000		5000
970	413	201						
971	106	201				10		100
972	102	201				10000	10	10000
973	414	201				10		100
974	106	201				10		100
975	414	201				15		50
976	106	201				25		500
977	102	201				5000		500
978	106	151				70		
979	907	201				30	100	100
980	907	201				20	10	400
981	906	201					20	30
982	912	201				150	50	200
983	906	201						
984	906	201					10	10
985	106	201				200	30	10
986	906	201				150	10	100
987	906	201				10	10	70
988	102	201				10	10	80
989	906	201				10	10	50
990	906	201				500	700	1500
991	906	201				15	10000	150
992	906	201				25	10	100
993	906	201				15	10	30
994	906	201				30	10	30
995	906	201				25	150	10
996	906	201					30	10
997	906	201					20	10
998	906	201						
999	407	201					10000	700
1000	407	201				10000	10000	10000

APPENDIX D

REPAIR EFFECTIVENESS

These data are listed by point source number and screening test number. The successful and unsuccessful repairs, based on the rescreening test following repair, are indicated by S and U, respectively.

Point	Screening test number 1	2	3	4	5	6
0013	U	U	U	U	U	U
0016	U			S		
0018	S					
0019		S	S			
0020	U	S				
0025				U	S	
0026	U	S				
0033		S		U		
0034		S	U	U		
0036		S	S	S		
0038		S				
0039		S		S		
0053	S					
0055	U	U	U	U		U
0058			U	U		U
0061						S
0062		S				
0067	S	S				
0068	U		U	S	U	U
0071			S			
0072	S					U
0073	U					
0074				S		
0076	U	U	U	U	U	U
0078	U	S				
0079			S			U
0080		S				
0081	U	S	U	S		
0106	U					
0107	S					
0116			S			
0118			S			
0133						S
0136	U	S				
0144	U					
0147		S				
0150		S				
0151	U		S	U		
0152	U		S			
0155						U
0157			U	U		
0158					S	
0159			U			
0163	S					
0164	S	S	U			U
0165		S	S	U	U	U
0166	S					
0167		S				

Point	Screening test number 1	2	3	4	5	6
0168				S		
0169			S			
0180	S					
0182	S		U	S		S
0186	S					
0203	S					
0205	S					
0209	U		U			U
0211		S				
0212						
0213	U	S	U	S		S
0214		S				
0217		S				
0220		S				
0224			S	S		
0227	U					U
0229	U	S				
0233		S				
0237		S				
0241			U			
0242		S				
0243	S					
0245	S		S			
0246						S
0249			U	U	U	U
0250			U		S	
0252						
0253	U					
0255						S
0257	S					
0258		S				
0259		S				
0260	S					
0261			S		U	U
0264						U
0269	U	S				
0273		U	U	U	U	U
0274	U	S				S
0276	U		S			
0279			U	S	S	
0286			S			
0288				U		U
0291	S					
0292				S		
0294	U	U		U	S	
0301		S				U
0305						S
0307			U		S	S

Point	Screening test number 1	2	3	4	5	6
0308			U			S
0309			U			
0310			S			
0312		U	S			
0314			U		S	
0322				U	S	
0326		S		U		
0330		S				
0331			S			
0336		S				
0337			S			
0341		S				
0344		S				
0347		S				
0348		S				
0349		S				
0352	U	S			S	U
0354					U	
0355					U	U
0356						U
0358		S	S			S
0361						U
0363		S		S	S	U
0364						U
0365		S	U	U	U	U
0367		S		S	S	S
0369		S				
0370		S				
0371						S
0372		U				
0373		S				S
0374	S					
0375					S	
0378		S				
0383		S			S	U
0386	U	S	U	U	U	U
0387		S				
0394			S			
0397			S			
0400	S					
0402		S		U		
0408		S				
0409		S				U
0413		S		U	S	
0414		S				
0415				U	S	S
0418				S		
0423			S			

Point	Screening test number 1	2	3	4	5	6
0425		S		S		
0426		S		U		
0427			S	U		
0428		S				
0430			S	U	S	S
0432	S			S		
0437		S				
0442		S		U		
0443	S			S		
0445		S		U	S	
0446		S			S	S
0447				U		
0448	S					
0449		U				
0450		S				
0453						S
0455		S		S		
0457	S	S		S	S	
0458				U		
0460	S			U		
0461		S				
0464	S	U		U		U
0466	U					U
0472			S			
0473				S	S	
0476				S		
0478		S				
0479		S				
0481			U		U	
0482		S				
0488				U		
0490	S					
0491			S			
0492				S		
0493		U	U		U	S
0494	S			U		
0495		S		U		S
0496						S
0497				U		
0498			S			
0499		U				
0500						
0501	U	S				
0505	U					
0506	U	S	U	U		U
0507		S	U	U		
0509			U	U		
0512		S				

Point	Screening test number 1	2	3	4	5	6
0514		U		S		S
0516			U	U		
0519	S	S	U	U		
0524		U		S		
0525	U					
0526					U	U
0528		S		S		
0529		S			S	
0532	S	U		U	S	
0537						
0538				S		
0539						
0541	U			S		
0542	S	U		U		
0543						
0545				S		
0546				S		
0551				S		
0554	U					
0555						
0559			S			
0565			S			S
0566						S
0572		U	S			S
0574		S		S		
0575	S			S		
0576		S	U	S	U	U
0580	S					
0584	U					
0586		S		S		
0588	U	S				
0590			S			
0595						
0599	S					
0602	U					
0611		S	U			
0613					S	
0614		U	S			
0615		S			S	
0616						U
0618	S	S	U	U		S
0620		S	U	U		
0622						
0624		S		U		
0627		S	U	U		
0628		S		U		
0629		S	U	U	U	
0630		S				

Point	Screening test number 1	2	3	4	5	6
0635		U		U	S	
0636				U		
0637		S		U		
0639						
0640		S	U	U		
0641	U	U	U	U		
0643	U	U		U	U	U
0644		U		U		
0646	U	S		S		
0649				S		
0650	U	S				
0653	U	S	U	U		
0655	U	S				
0656						U
0657	U	S				U
0658				U	S	U
0660	U	S		S		
0667	U	U		U	U	U
0672				U	U	S
0673				U	U	U
0674	U					
0676			S			
0689					U	
0699	U	S		U	S	
0700	S					
0703		U				
0705			U			
0707				S		
0709		S	U	U	S	
0714						
0717						
0723				S		
0738				U	S	
0739		S		S		
0741		S				
0744		U	U	U	U	S
0745				U	S	
0746		S		S		
0759				U		
0761					U	S
0774				S	S	
0779		S				
0780		S		U	S	
0781		S				
0782		S				
0789		S				
0790						
0791			S			

Point	Screening test number 1	2	3	4	5	6
0793		S				
0794					S	
0804		S				
0805		S	S			
0808		S				
0810		S				
0818				S		
0819				S		
0824				U	S	
0828					S	
0847			S	S		
0848					U	U
0852					U	U
0853		S				S
0859		U	S	S	U	U
0861		S				
0862			S	S	S	
0865			S			
0883				S		
0885			S			
0886			U	S	S	S
0889			S			
0892			S			
0897		S				
0898		S				
0899		S		S		
0903				S		
0906		S		S		
0941			S			
0947		S	S	S		
0956						S
0969				U		
0972				U		U
0991					S	
0999					S	
1000				S	S	S

APPENDIX E

KEMRON BAGGING RESULTS

The Kemron bagging data are listed in two sets: (1) data used in the leak rate analysis and (2) data not used in the analysis because repair was attempted prior to the bagging test. Within each set the data are subdivided by the source type and service, four subsets.

TABLE E-1. BAGGING DATA USED IN ANALYSIS, TABLE 12.

Flanges in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
1/10/80	164.	200.0	.5	.00255000	-5.9717
1/10/80	415.	750.0	3.0	.00860000	-4.7560
3/11/80	36.	210.0	1.5	.00151000	-6.4956
3/11/80	79.	210.0	4.0	.00002760	-10.4977
3/11/80	81.	210.0	4.0	.00067500	-7.3008
3/10/80	151.	200.0	3.0	.03160000	-3.4546
3/10/80	152.	200.0	.8	.02170000	-3.8304
3/10/80	157.	200.0	3.0	.06200000	-2.7806
3/10/80	159.	200.0	3.0	.00021800	-8.4310
3/10/80	164.	200.0	.5	.00976000	-4.6295
3/10/80	165.	200.0	3.0	.00458000	-5.3861
3/11/80	182.	210.0	.5	.00151000	-6.4956
3/11/80	261.	210.0	1.5	.10500000	-2.2538
3/11/80	273.	210.0	3.0	.01280000	-4.3583
3/11/80	279.	225.0	4.0	.02890000	-3.5439
3/11/80	307.	350.0	3.0	.00511000	-5.2766
3/11/80	309.	350.0	3.0	.00233000	-6.0619
3/12/80	331.	225.0	1.0	.00333000	-5.7048
4/17/80	33.	210.0	4.0	.00197000	-6.2297
4/17/80	36.	210.0	1.5	.00306000	-5.7893
4/17/80	39.	210.0	4.0	.00158000	-6.4503
4/17/80	81.	210.0	4.0	.00621000	-5.0816
4/17/80	151.	200.0	3.0	.01640000	-4.1105
4/17/80	157.	200.0	3.0	.08900000	-2.4191
4/17/80	165.	200.0	3.0	.00230000	-6.0748
4/17/80	182.	210.0	.5	.00194000	-6.2451
4/16/80	326.	225.0	1.5	.00212000	-6.1563
4/16/80	576.	750.0	.5	.00482000	-5.3350
4/16/80	818.	210.0	.8	.08300000	-2.4889
4/16/80	819.	210.0	2.0	.36300000	-1.0134
4/16/80	847.	325.0	1.0	.00718000	-4.9365
4/16/80	862.	200.0	1.5	.00526000	-5.2476
4/16/80	899.	325.0	1.0	.00930000	-4.6777
5/14/80	493.	750.0	.8	.00099000	-6.9178
5/14/80	493.	750.0	.8	.02540000	-3.6730
5/14/80	576.	750.0	.5	.00258000	-5.9600
5/14/80	613.	690.0	3.0	.16800000	-1.7838
5/14/80	629.	690.0	1.5	.02920000	-3.5336
5/14/80	635.	690.0	4.0	.08580000	-2.4557
5/14/80	848.	325.0	.5	.02640000	-3.6344
5/14/80	852.	325.0	.5	.02000000	-3.9120
5/14/80	862.	200.0	1.5	.01520000	-4.1865

TABLE E-1. (continued)

Flanges in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
5/15/80	445.	750.0	1.5	.06870000	-2.6780
5/15/80	446.	750.0	.8	.01470000	-4.2199
5/15/80	473.	750.0	1.0	.08420000	-2.4746
5/15/80	481.	750.0	1.5	.01420000	-4.2545
5/15/80	526.	750.0	.5	.00460000	-5.3817
5/15/80	529.	750.0	.5	.02500000	-3.6889
5/15/80	532.	750.0	.5	.00364000	-5.6158
5/15/80	658.	690.0	4.0	.01190000	-4.4312
5/15/80	673.	550.0	3.0	.006440000	-5.0452
7/09/80	361.	210.0	1.5	.00532000	-5.2363
7/09/80	363.	210.0	4.0	.00083500	-7.0881
7/09/80	367.	210.0	4.0	.00580000	-5.1499
7/09/80	371.	210.0	4.0	.00316000	-5.7572
7/09/80	373.	210.0	4.0	.00083500	-7.0881
7/09/80	446.	750.0	.8	.00545000	-5.2121
7/09/80	453.	750.0	1.0	.01440000	-4.2405
7/09/80	466.	750.0	.8	.01180000	-4.4397
7/09/80	493.	750.0	.8	.04140000	-3.1845
7/09/80	493.	750.0	.8	.00083500	-7.0881
7/09/80	495.	750.0	1.5	.00548000	-5.2067
7/09/80	496.	750.0	.8	.05760000	-2.8542
7/09/80	500.	750.0	1.0	.00083500	-7.0881
7/09/80	506.	750.0	1.5	.03460000	-3.3639
7/09/80	576.	750.0	.5	.00292000	-5.8362
7/09/80	616.	690.0	4.0	.00575000	-5.1586
7/09/80	848.	325.0	.5	.03750000	-3.2834
7/09/80	852.	325.0	.5	.17000000	-1.7720
7/09/80	853.	325.0	15.6	.00497000	-5.3043

TABLE E-1. (continued)

Valves in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
1/10/80	150.	200.0	3.0	.00115000	-6.7680
1/10/80	301.	350.0	3.0	.00359000	-5.6296
3/11/80	34.	210.0	1.5	.01170000	-4.4482
3/10/80	76.	210.0	1.5	.00518000	-5.2630
3/11/80	249.	210.0	1.5	.05050000	-2.9858
3/11/80	250.	210.0	1.0	.00154000	-6.4760
3/12/80	286.	350.0	3.0	.01190000	-4.4312
3/12/80	308.	350.0	3.0	.02800000	-3.5756
3/11/80	310.	350.0	.8	.00295000	-5.8260
3/11/80	312.	350.0	.4	.00290000	-5.8430
3/12/80	314.	350.0	.8	.00907000	-4.7028
4/17/80	34.	210.0	1.5	.01770000	-4.0342
4/17/80	74.	210.0	.8	.00536000	-5.2288
4/17/80	76.	210.0	1.5	.00521000	-5.2572
4/16/80	322.	225.0	1.5	.00802000	-4.8258
4/16/80	586.	690.0	4.0	.00811000	-4.8147
4/16/80	774.	210.0	1.5	.01190000	-4.4312
4/16/80	780.	210.0	.5	.00370000	-5.5994
4/16/80	824.	325.0	.8	.58000000	-0.5447
4/16/80	859.	200.0	1.5	.00590000	-5.1328
4/16/80	883.	325.0	2.0	.00840000	-4.7795
4/16/80	886.	325.0	1.5	.01620000	-4.1227
4/16/80	903	210.0	1.5	.00484000	-5.3308
4/16/80	906.	210.0	1.5	.00225000	-6.0968
5/14/80	457.	750.0	2.0	.01360000	-4.2977
5/14/80	643.	690.0	4.0	.04600000	-3.0791
5/14/80	774.	210.0	1.5	.01110000	-4.5008
5/14/80	794.	210.0	1.0	.00528000	-5.2438
5/14/80	780	210.0	.5	.00429000	-5.4514
5/14/80	824.	325.0	.8	.21400000	-1.5418
5/14/80	828.	325.0	2.0	.00456000	-5.3904
5/14/80	859.	200.0	1.5	.11600000	-2.1542
5/14/80	886.	325.0	1.5	.00193000	-6.2502
5/15/80	365.	210.0	1.5	.07090000	-2.6465
5/15/80	639.	690.0	4.0	.00311000	-5.7731
5/15/80	667.	550.0	4.0	.01160000	-4.4568
5/15/80	672.	550.0	3.0	.14050000	-1.9625
5/15/80	699.	650.0	1.0	.00099000	-6.9178
5/15/80	738.	550.0	1.0	.00457000	-5.3882
5/15/80	744.	700.0	.4	.01070000	-4.5375
5/15/80	745.	550.0	.8	.00229000	-6.0792
7/09/80	308.	350.0	3.0	.00271000	-5.9108

TABLE E-1. (continued)

Valves in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
7/09/80	352.	750.0	2.0	.00113000	-6.7855
7/09/80	354	750.0	.5	.00625000	-5.0752
7/09/80	355.	750.0	.5	.00549000	-5.2048
7/09/80	356.	210.0	.5	.00083500	-7.0881
7/09/80	358.	210.0	2.0	.00275000	-5.8962
7/09/80	364.	210.0	.5	.00121000	-6.7171
7/09/80	365.	210.0	1.5	.04840000	-3.0283
7/09/80	409.	750.0	.5	.00904000	-4.7061
7/09/80	414.	750.0	3.0	.01500000	-4.1997
7/09/80	464.	750.0	3.0	.05850000	-2.8387
7/09/80	514.	750.0	3.0	.09200000	-2.3860
7/09/80	618.	690.0	4.0	.07200000	-2.6311
7/09/80	643.	690.0	4.0	.03720000	-3.2914
7/09/80	859.	200.0	1.5	.08910000	-2.4180

TABLE E-1. (continued)

Flanges in gas service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
1/10/80	211.	40.0	.5	.00008360	-9.3895
1/10/80	213.	40.0	.5	.00309000	-5.7796
1/10/80	237.	.0	.0	.00005330	-9.8396
3/11/80	13.	40.0	8.0	.25500000	-1.3665
3/11/80	19.	40.0	6.0	.00039200	-7.8442
3/11/80	55.	40.0	8.0	.00338000	-5.6899
3/11/80	58.	40.0	3.0	.00450000	-5.4037
3/11/80	68.	40.0	6.0	.08060000	-2.5183
3/10/80	209.	40.0	6.0	.00025500	-8.2742
3/10/80	213.	40.0	.5	.01610000	-4.1289
3/10/80	224.	40.0	4.0	.00048000	-7.6417
3/10/80	241.	40.0	2.0	.00225000	-6.0968
3/10/80	245.	40.0	.8	.00049000	-7.6211
4/17/80	25.	40.0	6.0	.00892000	-4.7195
4/17/80	55.	40.0	8.0	.00511000	-5.2766
4/17/80	58.	40.0	3.0	.02710000	-3.6082
4/17/80	68.	40.0	6.0	.05250000	-2.9469
4/17/80	168.	40.0	6.0	.00082600	-7.0989
4/16/80	213.	40.0	.5	.00382000	-5.5675
4/16/80	224.	40.0	4.0	.00082600	-7.0989

TABLE E-1. (continued)

Valves in gas service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
1/10/80	136.	40.0	6.0	.00635000	-5.0593
1/10/80	229.	40.0	.4	.00000836	-11.6921
1/10/80	233.	40.0	4.0	.00003200	-10.3498
3/11/80	71.	40.0	.8	.00034000	-7.9866
4/17/80	16.	40.0	3.0	.01230000	-4.3982
7/09/80	383.	70.0	3.0	.02190000	-3.8213
7/09/80	386.	70.0	1.5	.00611000	-5.0978

TABLE E-2. BAGGING DATA NOT USED IN ANALYSIS.

Flanges in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
12/02/79	252.	210.0	3.0	.00685000	-4.9835
11/30/79	466.	750.0	.8	.00285000	-5.8604
12/01/79	526.	750.0	.5	.00594000	-5.1260
12/01/79	528.	750.0	.8	.00959000	-4.6470
12/01/79	537.	750.0	.8	.00267000	-5.9257
12/01/79	538.	750.0	.5	.00667000	-5.0101
12/01/79	539.	750.0	.8	.00148000	-6.5157
12/01/79	543.	750.0	.8	.00228000	-5.0836
12/01/79	555.	750.0	.5	.00468000	-5.3645
11/30/79	576.	750.0	.5	.01420000	-4.2545
11/30/79	588.	690.0	.5	.01290000	-4.3505
11/30/79	595.	690.0	.8	.00847000	-4.7712
11/30/79	622.	690.0	.8	.00089000	-7.0243
11/30/79	641.	690.0	1.0	.06770000	-2.6927
11/30/79	650.	690.0	.8	.02890000	-3.5439
11/27/79	655.	690.0	.5	.03660000	-3.3077
11/28/79	707.	650.0	.5	.00824000	-4.7988
11/28/79	709.	650.0	.8	.00482000	-5.3350
11/28/79	714.	650.0	2.0	.00792000	-4.8384
11/28/79	717.	650.0	1.0	.00160000	-6.4378
11/27/79	897.	325.0	1.5	.00377000	-5.5807
2/06/80	273.	210.0	3.0	.00000836	-11.6921
2/06/80	294.	225.0	4.0	.02400000	-3.7297
2/07/80	449.	750.0	.8	.00855000	-4.7618
2/07/80	493.	750.0	.8	.01760000	-4.0399
2/07/80	499.	750.0	.0	.00000836	-11.6921
2/07/80	524.	750.0	.8	.00369000	-5.6021
2/08/80	532.	750.0	.5	.00580000	-5.1499
2/07/80	542.	750.0	.4	.08600000	-2.4534
2/06/80	614.	690.0	4.0	.00793000	-4.8371
2/06/80	635.	690.0	4.0	.00655000	-5.0283
2/07/80	641.	690.0	1.0	.19300000	-1.6451
2/07/80	644.	690.0	4.0	.00222000	-6.1102
2/08/80	703.	650.0	1.0	.00563000	-5.1796

TABLE E-2. (continued)

Valves in liquid service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
12/01/79	699.	650.0	1.0	.01450000	-4.2336
12/01/79	738.	550.0	1.0	.04060000	-3.2040
12/01/79	739.	550.0	.8	.01600000	-4.1352
12/01/79	741.	700.0	.5	.02140000	-3.8444
12/02/79	886.	325.0	1.5	.03300000	-3.4112
11/27/79	898.	325.0	.8	.00811000	-4.8147
2/06/80	76.	210.0	1.5	.00008550	-9.3670
2/07/80	312.	350.0	.4	.00138000	-6.5857
2/07/80	464.	750.0	3.0	.07370000	-2.6078
2/07/80	514.	750.0	3.0	.00785000	-4.8472
2/08/80	572.	550.0	2.0	.01260000	-4.3741
2/07/80	643.	690.0	4.0	.01150000	-4.4654
2/08/80	667.	550.0	4.0	.01070000	-4.5375
2/08/80	744.	700.0	.4	.00433000	-5.4422
2/07/80	859.	200.0	1.5	.00364000	-5.6158

TABLE E-2. (continued)

Flanges in gas service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
11/28/79	211.	40.0	.5	.00224000	-6.1013
11/28/79	212.	40.0	.8	.09580000	-2.3455
12/02/79	227.	40.0	.8	.00584000	-5.1430
2/06/80	13.	40.0	8.0	.05340000	-2.9299
2/06/80	55.	40.0	8.0	.00032000	-8.0472

TABLE E-2. (continued)

Valves in gas service

Date	Point	PSIG	Size, in.	Leak rate, lb/h	Log (leak rate)
12/02/79	26.	40.0	6.0	.00267000	-5.9257
12/02/79	136.	40.0	6.0	.00948000	-4.6586
11/30/79	790.	2.0	.8	.02150000	-3.8397
11/28/79	244.	40.0	.5	.00272000	-5.9071
11/28/79	244.	40.0	.5	.00123000	-6.7007
11/30/79	805.	325.0	.8	.02200000	-3.8167